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A CONTRIBUTION TO THE STUDY OF EPIDERMOPHYTON INGUINALE

NOTES ON AN INQUIRY INTO THE MORPHOLOGY OF THE CAUSATIVE FUNGI; A CLINICAL AND LABORATORY STUDY OF THIRTY-SEVEN CASES OF DERMAL SCALING

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The higher fungi were credited with being the causative factors in the production of human disease processes long before the recognition of the important rôle played therein by the lower fungi by Langenbeck, 1839; Schoenlein, 1839; Pasteur, 1862, and Koch, 1882. During the era in which the causal relationship of bacteria to human disease was being developed, interest lagged in regard to the etiologic importance of the higher fungi. Since 1900, the importance of the higher fungi in the production of pathologic states has received more attention and their etiologic rôle has been more clearly recognized. That the integumentary system is most often the site for their implantation and growth is obvious and is shown in the large number and variety of skin lesions due to them.

The findings of bacteriologists and dermatologists lead one to consider that a wide distribution of dermatologic lesions due to the higher fungi exists; that many different species are causative factors, and that certain clinical types of such lesions may be produced by species morphologically dissimilar. On the other hand, one is constrained to believe that skin lesions clinically dissimilar may be due to the same species of fungi which at times may be virulent, at other times inert; at times pathogenic, at other times saprophytic. Indeed, Sabouraud claims that a change of country frequently determines a change in virulence, so that a change in local environment may well cause a change in morphologic development. All this may account for the seeming discrepancies in the discussions of various authorities, for the lack of sharp-cut distinctions, and for an amount of indefiniteness and obscurity that has prevented proper appreciation and clear understanding of interesting and easily recognized skin lesions—lesions that fre-

quently are permanently eradicated with great difficulty, that often are chronically recurrent, and that actually are unsightly and annoying but not dangerous nor deforming.

Probably no group of skin lesions has recently excited greater interest and investigation than those produced by tinea fungi. In 1844, Gruby described two varieties of fungi in ring form—large spore and small spore. This observation remained many years forgotten until it was revived and verified by Sabouraud. While *Tinea trichophyton*—large spore—lesions are common in tropical and subtropical regions, they are apparently not so common in temperate regions. Castellani, in 1905, while in Ceylon, described a fungus from human skin lesions that he called *Trichophyton cruris;* the fungus was independently reported in France by Sabouraud in 1907, and was named *Epidermophyton inguinale.* Castellani [1] claims that, according to the laws of nomenclature, this fungus should be called *Epidermophyton cruris. Epidermophyton inguinale* differs from the other tinea in that it does not attack the hair or hair follicles and in that the color of the colonies on Sabouraud's medium is lemon or orange yellow.

Since the publication in this country of the papers by Ormsby and Mitchell,[2] and by White,[3] we have been particularly interested in the skin lesions said to be produced by *Epidermophyton inguinale.* We have endeavored to determine: whether the lesions on the flat skin surfaces and those in the skin folds, that clinically are so different, are due to different varieties of the same fungus or to a single variety morphologically modified by the slightly different environment presented by the various sites; and, if due to a fungus, whether the fungus is a modified tricophyton or a modified epidermophyton.

SITE OF EPIDERMOPHYTON INGUINALE LESIONS AND DURATION

From the designation *Epidermophyton inguinale,* the inguinal region would be considered the most frequent site of the lesions, but the few observations made by us indicate that the skin lesions due to the epidermophyton may be found on any part of the body. Our observations corroborate the statement made by White in his report on a many times larger number that in the United States the inguinal region is not so frequently the site as are other parts. In all probability the name was given to this fungus because it was first recovered from lesions occurring in the inguinal region. In our small series we found epi-

1. Lancet **1**:945 (May 1) 1920.

2. Ormsby, O. S., and Mitchell, J. H.: Ringworm of Hands and Feet, J. A. M. A. **67**:711 (Sept. 2) 1916.

3. White, C. J.: Epidermophyton Infection, J. Cutan. Dis. **37**:501 (Aug.) 1919.

Fig. 1. — Vesicles appearing in groups and blebs; slight desquamation; resembles pompholyx.

dermophyton lesions at the following sites: face, one case; axilla, one case; hands, one case; abdomen, one case; nates, one case; anus, two cases; groins, five cases; thighs, two cases; legs, four cases, and feet, eleven cases.

Our findings also seem to corroborate those of White in regard to sex, age and duration. The larger number of lesions were found in males; they occurred during the third and fourth decades; the duration was in periods of months rather than days or years. Our inquiry did not go into the possible relation of occupation or into the possible source of the infection.

APPEARANCE AND TRANSMISSIBILITY

In general, the appearance of the lesions in our series may be summed up as areas of scaliness varying in size from that of a split pea to 4 and 5 inches square or even larger. The lesions were more or less sharp in outline, with thickening of the epidermis without inflammation of adjoining tissue, although underneath the scales there was some redness. In those areas in which the skin was naturally moist, as between the toes, the epidermis was moist and soggy. The color of the lesions in the moist area was usually a dirty white while in the dry areas it was more or less gray, red or brown. Distributed through portions of the lesions deep seated vesicles were frequently seen; often at the inception of the trouble blebs strikingly resembling pompholyx were present. Itchiness and hyperhidrosis were present, while in the folds and moist areas an unpleasant odor, almost a bromidrosis, occurred. Occasionally the process seemed to be influenced by the season, being worse in summer, better in winter.

In none of our cases could it be determined that autoinoculation took place, although the larger number of patients had multiple lesions in widely distributed areas. In regard to the transmissibility of *Epidermophyton inguinale*—we have under observation four members of one family each presenting proved epidermophyton lesions. The father has had patches in the groin and on both plantar surfaces for eighteen years; the mother has had the same condition in the groins and on both plantar surfaces for seven years; one son has had the condition on both plantar surfaces as well as interdigitally for one year, and another son has had it for nine months in the same locations as his brother.

CASES STUDIED BY AUTHORS

In the plan of study cases were selected from the ordinary day's work and short clinical records made. Scales and scrapings were obtained from the various lesions and subjected to microscopic examination for the presence of spores and mycelia; if possible, some of the hairs present in the lesions were included. In cases showing spores

Fig. 2.—Distinct dirty, white, soggy, intertriginous desquamation and thickening; desquamation over plantar surface with deep-seated vesicles.

or mycelia an effort at identification of the fungi was made by means of cultures from the specimens obtained both in vitro and in vivo. In order to check the work and as controls and for differential study specimens were taken from similar lesions due to other known fungi and from lesions of similar character not caused by fungi.

Diagnoses.—All the cases selected for observation presented skin lesions showing scaling with or without vesication, with or without slight redness and with little or no itching. Our series consists of thirty-seven cases, of which these clinical diagnoses were made: acne, two cases; blepharitis, one case; callus, two cases; dermatitis herpetiformis, two cases; eczema, five cases; folliculitis agminate (Hartzell) or hyphomycetes granulosum (Schamberg), one case; epithelioma, one case; neurodermatitis, one case; pityriasis rosea, two cases; tinea capitis, eight cases; tinea cruris, one case; tinea trichophytina, three cases; epidermophyton inguinale, eight cases; not diagnosed, one case.

Of the twenty-one cases which clinically were diagnosed as due to fungi, nineteen were found to present spores or mycelia of which thirteen may be classed as epidermophyton inguinale. Of the eight cases clinically diagnosed as epidermophyton inguinale, the cultures showed six to be due to that fungus. One case diagnosed as eczema proved to be due to the epidermophyton. Of the three cases diagnosed as trichophyton, all were proved to be epidermophyton. The case not diagnosed was shown to be due to the epidermophyton. The case diagnosed as agminate folliculitis proved to be due to epidermophyton. In the case diagnosed as tinea cruris the laboratory reported negative findings. From this analysis the clinical recognition of epidermophyton inguinale lesions is fairly easy, although unquestionably frequently overlooked because the lesions so imitate other skin conditions that careful and more extended examination of the patient is not made with the possibility of epidermophyton as the etiologic factor in mind.

Cultural Characteristics of Epidermophyton Inguinale.—Sabouraud, using the culture medium that bears his name, asserts that the peculiar cultural characteristics of the cryptogam, *Epidermophyton inguinale,* which is but a representative of the trichophyton group, while not making the recognition easy, make it less difficult; he also states that the fungus is isolated with comparative ease. He says that its characters and differences may be classified under three heads: (*a*) original appearance, (*b*) rapid pleomorphic transformations, and (*c*) organs. In his descriptions he states, under the heading appearance, that the culture growths show a powdery surface radiating in form, the center being umbilicated and covered by an embossment of the culture growth, in color a grayish-yellow with an areola of citrin hue, and that these forms are reproduced on proof mediums. Under the heading pleo-

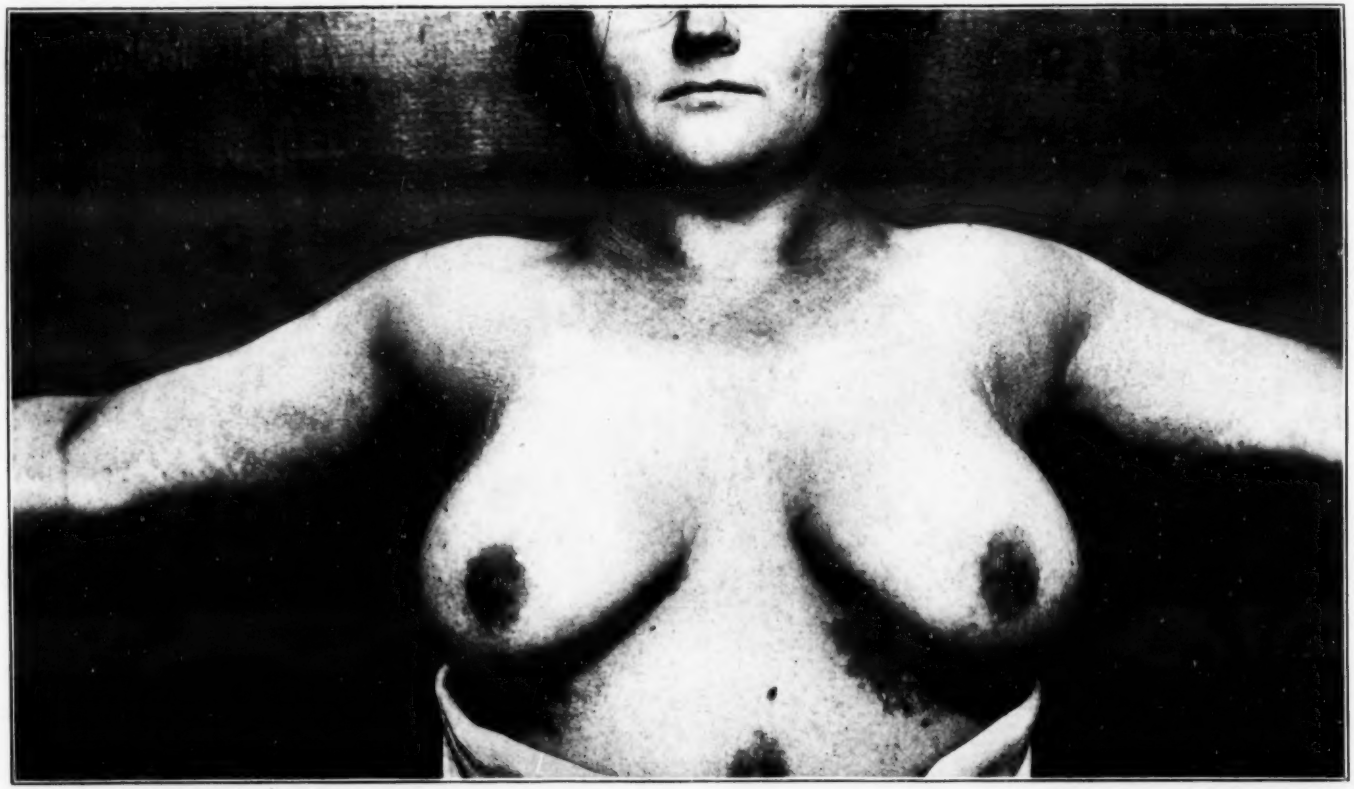

Fig. 3.—Large desquamating yellowish-brown areas on flat surfaces and in moist fields; history of vesication in axillae and under breasts. The condition has existed for twelve years; at times it has been almost absent, at others even more pronounced than shown. This case is not included in the thirty-seven systematically studied, but laboratory findings proved the presence of Epidermophyton inguinale.

morphism he says that the growth on sugar or glycerin mediums is especially characteristic of *Epidermophyton inguinale* in that after three or four weeks a white duvet of absorbent cotton-like tufts gradually covers the entire surface of the mediums; and that this degenerating form growth invariably is reproduced on reseeding in sugar mediums. while the original may be rejuvenated by planting in proof mediums like peptone water. Under the heading organs, he says that microscopically the growth presents enclosed clubs or asci, pediculated laterally or terminally on the mycelia filaments and usually arranged in banana-like bunches. Sabouraud further asserts that *Epidermophyton inguinale* is the only trichophyton cryptogam known to present these characteristics.

Technic Used by Authors.—Sabouraud's technic was followed throughout the laboratory study of the thirty-seven specimens examined. The investigation consisted of four steps: (*a*) the usual microscopic examination of the scales and hairs for spores, mycelial threads and fungal organs; (*b*) the direct making of two separate plants in Sabouraud's medium of the scales found to contain spores—these plants were designated "primary and secondary"—and the reseeding of each through ten to twelve generations which were designated "subsequent" cultures; (*c*) the microscopic examination of the mycelia and organs produced from each culture, and (*d*) the inoculation of guinea-pigs with the culture growth diagnosed as *Epidermophyton inguinale.* When an inoculation was made the hair of the guinea-pig was cut short, and the closely trimmed surface cleansed with alcohol and scarified, after which the macerated culture growth was rubbed in freely. As a control the hair was clipped at another location remote from the inoculation and the cut surface cleansed and scarified but not inoculated.

The stain used for the microscopic examinations from the first twenty-seven cases was methylene blue; for the remaining ten Ehrlich's triple-stain was used. In our opinion Ehrlich's stain gave the better picture.

The microscopic examination of the original scrapings from the thirty-seven cases showed the presence of spores in twenty-six, of mycelia threads in three and of fungal organs (asci) in five; spores were absent in thirteen cases.

Results.—The primary and secondary plantings of the twenty-six cases showing the presence of spores resulted in the production of fungal growths in twenty-four, while in two no growth was secured. The twenty-four molds were identified thus: *Epidermophyton inguinale,* 13; *Microsporon audouini, 7*; *Microsporon minutissimus,* 1; one unidentified mold; *Oidium,* 1 (later observation indicates that this was an epidermophyton); *Aspergillus,* 1 (the aspergillus was a common

contamination in most of our cases; this was corroborated in the animal inoculations; this fungus bears no relation to the etiology of the lesion. Most investigators report some type of the penicillium as a contaminating fungus; with us it was of rare occurrence).

Of the thirteen cases identified as *Epidermophyton inguinale,* the microscopic examination of the original specimens showed the presence of mycelium in three and of asci in five, spores in chains or rows in four and crescentic asci in five, one of which was also septated.

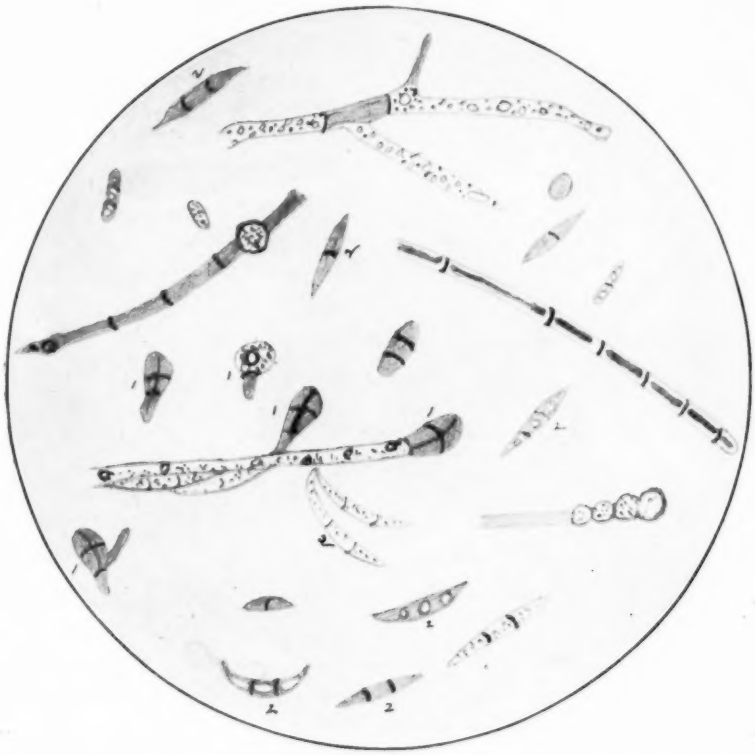

Fig. 4.—The various forms of mycelia and asci seen microscopically in the cultures of the epidermophytons, rubrum and citrin; 1, pyramidal asci; 2, fusiform and crescent asci.

The colonies in the upwards of 312 "primary and secondary" and "subsequent" cultures all showed a central accuminate growth surrounded by a distinct flattened areola which was again surrounded by the duvet as a lighter fringe; the only exceptions were those derived from one case in the colonies from which the areola was absent. In one case the areola was flat, an atypical growth; this case was off-type all the way through.

The characteristic pleomorphism was demonstrated in the matrass, which in all of the cultures was at first yellow or orange in color. This yellow color persisted in seven of the primary plantings and in four of the secondary plantings. In one both the primary and secondary plantings rapidly became rose red; this case seemed to answer to the description of the *"Epidermophyton rubrum"* of Castellani.[1] One case after several weeks in both primary and secondary plantings became green. In four cases of the primary plantings and in seven of the secondary plantings the matrass became black. In the subsequent cultures the same colors were respectively obtained as in the primary and secondary.

In all cultures the duvet began as an absorbent cotton-like growth, with the exception of one case in which the hyphae presented a

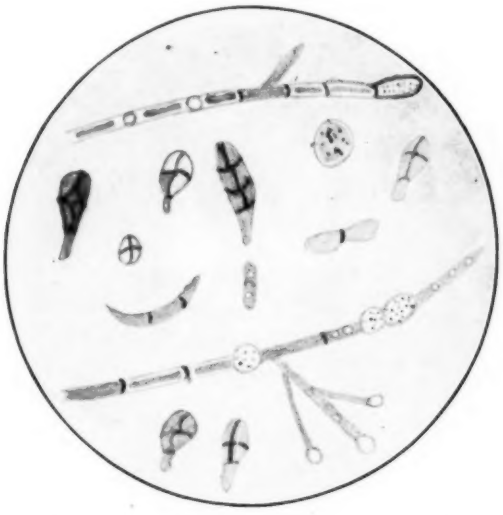

Fig. 5.—Forms of mycelia and asci seen microscopically in cultures of the epidermophytons, noire and noire-gris. The asci are tinted yellow to brown.

bristle-like growth and in one case in which the hyphae were short. The color of the duvet in all cultures at first was white. This persisted throughout in the red type and in the green type. In the yellow type after ten or twelve generations the duvet took on a salmon-pink color. In the black type the duvet passed through a grayish-green to a mouse-gray color, with the exception of one case in which it became soot black. Here also is evidence of pleomorphism.

In all cultures the mycelial threads were septated with occasional nonseptated, highly granular branches. The asci were given off terminally and laterally, often in bunches like bananas; they bore from two to eight or more spores. The mycelium in subsequent cultures was often a more or less homogeneous mass and not well differentiated as

to structure; the same condition was noted in two of the original specimens submitted; in the case in which the duvet became soot black the mycelial threads were clearly differentiated.

Except in two cases, pyramidal forms of asci were present in the primary and secondary plantings. In the seven black type cultures the pyramidal form persisted throughout all subsequent cultures. In the eight yellow type cultures, after a few generations, the pyramidal asci were lost. In twelve cases, fusiform, crescentic and oval asci occurred and were the pleomorphic forms. In the green type case only the oval asci were found. In one yellow type case the pyramidal forms of asci only appeared after the fourth reseeding to disappear in the following one. In seven cases of the red and yellow types the asci at times took on a diminutive form without change in character. One case, on the fourth reseeding, gave small spores, but in the following

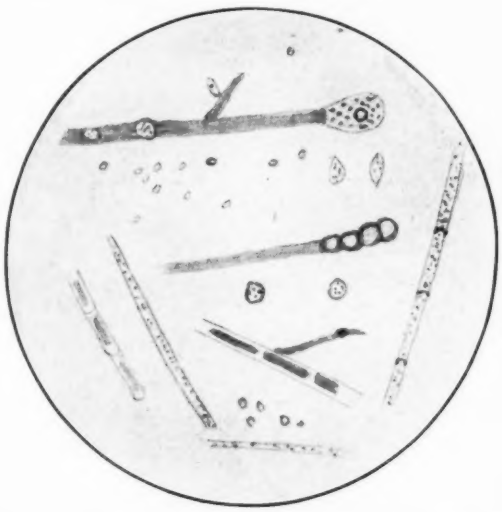

Fig. 6.—Forms of mycelia, asci and spores seen microscopically in cultures of an atypical epidermophyton (laboratory case No. 8). The small slender mycelium and spores predominate. The asci are few in number.

ones reverted to large type. In the black cultures the asci took on yellow to brown tints.

The laboratory designation of *"Epidermophyton inguinale"* was based chiefly on the microscopic morphology. The pleomorphism in our series was marked and interesting, and a more careful and extended investigation should be made to account for it. Our systematic examinations were made on Sabouraud's medium. We used proof agar and beer-wort agar, but they did not give different results. All changes herein described took place in the same batch of mediums. Peptone

water was used for keeping the cultures. The formation of oxalate crystals in the medium was never noted in cases of the epidermophyton group, but was frequently observed in cultures of the penicillium and the aspergillus groups.

One interesting development in our work, which we believe has not been noted heretofore by other observers, is the presence of two types of the fungus in the same lesion. The two types gave identical skin reactions in the guinea-pig. Four of our cases showed this double infection.[4]

The inoculations into guinea-pigs with macerated pure cultures from each of the thirteen cases designated "*Epidermophyton inguinale*" gave rise to scaling in different degrees, and the hair did not grow in until after several weeks. Preparations of the scales from the inoculated

Fig. 7.—Microscopic appearance of scales treated with 30 per cent. potassium hydroxid and stained; 1, disintegrated scales—spores in rows and asci; 2, scales, slightly disintegrated, filled with spores; 3, scales, disintegrated, spores and asci and nondifferentiated mycelium; and 4, scales filled with spores and differentiated mycelium.

guinea-pigs showed mycelium and asci. The results from inoculations from both the black-gray type and the yellow type were identical. The findings were the same whether the two types had been isolated from the primary and secondary plantings from the same lesion or from the primary and secondary plantings which gave only one type. The pic-

4. In a recent personal communication from M. Sabouraud, he states that only one type is found in the same case and in the same lesion.—"Dans les cas de Trichophytic on ne pouve *qu'-une* espece sur un malade et jamais plusieurs Trichophytons sur un meine malade et dans la meme lesion."

ture presented in guinea-pig controls in which clipping and scarifying alone were done was very different; there was no scaling and the hair grew in quickly. In the guinea-pigs inoculated after the same manner with cultures of aspergillus the hair grew back in two days; there was no scaling. The guinea-pigs inoculated with aspergillus invariably died on the third or fourth day, whereas those inoculated with the "*Epidermophyton inguinale*" lived.

CONCLUSIONS

1. Recognition of the skin lesions of *Epidermophyton inguinale* presents little difficulty; these lesions occur relatively often among scaly skin diseases. Parts of the body other than the inguinal region present original lesions with greater frequency than the name would imply. This condition is well shown in Figure 3 in which there is a general distribution over the entire body; the lesions, however, are confined to the anterior surfaces and are found on the face extending down over the neck, in the axilla, over the shoulder down on the arm to below the elbow, on the trunk below the breasts, about the umbilicus, and on the toes; the groin lesions occurred as three slightly scaly areas, each about the size of a quarter. The designation is, therefore, somewhat misleading when considering lesions at other locations than in the groin.

2. Epidermophyton lesions vary so much in appearance that errors in diagnosis are easily possible unless reasonably full and careful clinical examination and study are made. The character of pleomorphism is as applicable to its lesions as it is to its laboratory growth; environment seems to affect the activity and character of both lesion and growth. In our cases the lesions of flat surfaces and of the folds were due to the same type of fungus.

3. The problems of autoinoculation, sources of infection and conditions favoring human implantation and growth should receive early study and solution, as the frequency of the disease indicates increasing virulence and possibly the development of greater pathologic importance.

4. Laboratory recognition is neither intricate nor difficult. It requires no apparatus not found in every modest clinical laboratory.

5. The characteristic appearance, pleomorphism and biologic reaction are readily secured, and are distinct and easily recognized. The conditions determining the pleomorphism should be further studied.

6. The multiplicity of laboratory growth types without apparent clinical pathologic variability has not before been reported. This presents an extremely interesting problem that should receive further investigation to determine whether it is of any etiologic value as well as mycologic importance.

TUBERCULOSIS OF THE LIP*

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Tuberculosis in the buccal cavity presents itself in almost as many diverse forms as on the integument, and frequently gives rise to diagnostic errors. The subject is given scant consideration in textbooks on dermatology, usually under the heading of tuberculosis cutis orificialis, and in books on general medicine it is considered briefly in relation to respiratory tuberculosis. Special treatises on diseases of the mouth, such as that of Mikulicz and Kümmell,[1] recognize these types of oral tuberculosis: (1) lupus of the mucous membranes; (2) tuberculosis ulcerations, rhagades and infiltrates of the tongue and lip; (3) isolated ulcers of the soft palate; (4) miliary ulcerations occurring at the corners of the mouth, on the lip and edges of the tongue in advanced cases of phthisis. Jadassohn,[2] in his masterly review of the subject of tuberculosis of the skin and mucous membranes, divides this into: (1) lupus of the mucous membranes; (2) miliary ulcerations involving the mucous membranes and adjacent skin; (3) tuberculous ulcers of nonmiliary character involving the lip, tongue and genital regions. Osler[3] states that tuberculosis of the lip is extremely rare even in cases of advanced pulmonary disease. Considering the frequency with which tubercle bacilli in the sputum come in contact with the lips, it seems unusual that they should be so seldom affected. An internist who sees large numbers of pulmonary cases recently stated that he had never seen an involvement of the lip in more than 20,000 patients with tuberculosis examined by him. In view of these facts, the subjoined case seems of sufficient interest to warrant a detailed report.

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1. Mikulicz, J., and Kümmell, W.: Erkrankungen der Mundhöhle, Ed. 2, Jena, 1911.

2. Jadassohn, J.: Tuberkulose der Haut, Mracek's Handbuch der Hautkrankheiten **4**:1, 1907.

3. Osler, William: Practice of Medicine, Ed. 8, New York, D. Appleton & Co., 1912, p. 211.

REPORT OF CASE

History.—M. H., man, aged 56, presented himself at the Northwestern Medical School Dispensary complaining of a painful swelling of the lower lip. He gave a history of repeated attacks of pneumonia, the first one in 1890 in Russia, and again in 1902. Ten years ago, he had bronchitis and pleurisy. For many years he had had a winter cough, which had stopped three years before when he discontinued smoking. Recently he had had occasional night sweats, and had lost some weight. There was no history of hemoptysis. Ten months ago he first noticed the swelling of the lip which grew worse after influenzal pneumonia of three weeks' duration, in May, 1919. About the same time, ulcers in the mouth developed, causing pain and a burning sensation and difficulty in eating. He had had several teeth extracted in the last few months. His appetite was poor, and he complained of general weakness.

The family history was uneventful. Four sisters and one brother were living in Russia. His father died at the age of 68 of paralysis, and his mother

Fig. 1.—Tuberculosis of the lip. (The ulceration at the right is the biopsy wound.)

at 76 of senility. There was no family history of tuberculosis. One daughter and one son were in good health.

Physical Examination.—The patient was extremely emaciated and pale. Except for the chest findings, the physical examination was negative. Dr. Herbert W. Gray of the medical department made a careful examination of the chest and reported as follows: Distinct drooping of the right shoulder; very prominent clavicles on both sides, especially the right, on which side the fossae are very prominent; dull on percussion over both apexes and over the first left interspace; hyperresonant over the second interspace and dull over the third and fourth on the same side; dull along both sides of the sternum from the first to the fourth interspaces.

Heart examination revealed the apex in the sixth interspace in the midclavicular line. The right border was 1.5 cm. left of the left parasternal line. There were two tones but no murmurs. Posteriorly the thorax was dull and hyperresonant, bilaterally from the apexes down to the eighth rib and laterally to the midscapular line on the right and to the inferior border of the scapula on the left. The rest of the chest, particularly the right anterior and both

axillary regions, and inferiorly below the eighth ribs, was distinctly hyperresonant to percussion with diminished breath sounds. There was compensatory breathing over both lower lobes in the axillary area. Distinct bronchial breathing of a cavernous character was noted at the apex of the right upper lobe. There was a difference of 1 cm. between forced inspiration and expiration, showing the high grade of emphysema present in the functioning lung. No râles were heard during the entire examination.

Diagnosis.—The diagnosis was chronic phthisis, with extensive chronic emphysema; heart displaced to the left due to pulling of adhesions; chronic mediastinitis; very slight degree of activity at the present time.

Roentgenologic Findings.—Dr. Blumenthal of the roentgen-ray department reported on the fluoroscopic examination as follows; extensive fibrosis of upper right lung; pericardial adhesions to the diaphragm; adhesions to the trachea displacing it toward the right; moderate fibrosis of the left lung.

Fig. 2.—Tuberculosis of the lip showing ulceration of the buccal mucous membrane.

Description of Lesions in the Mouth.—The entire lower lip was uniformly enlarged, about twice the size of the upper lip, and indurated to the touch, with several small areas of denuded epidermis. Under glass pressure, minute nodules could be discerned. The inner aspect of the lower lip down to the gingival border showed a superficially ulcerated area about 2 cm. broad with a granular base, sloping edges and was surrounded by edematous mucous membrane for some distance on each side. On palpation, the ulcer felt moderately indurated. At the inner aspect of the upper lip near the right commissure was an abruptly excavated ulcer 0.5 cm. in depth with an irregular base. This ulcer felt soft to the touch. Opposite the last lower right molar was a third shallow ulcer about 1 cm. in circumference of a similar type. The few remaining teeth in the lower set showed evidence of extensive decay and pyorrhea. The gums of the lower jaw were spongy, edematous, and exuded pus on pressure. The tongue, palate and pharynx appeared normal. A laryngologic examination was negative.

Laboratory Findings.—The Wassermann reaction was negative. The blood pressure was 115 systolic, and 65 diastolic. Hemoglobin was 75 (Sahli). Red blood cell count revealed 5,200,000 cells; the leukocyte count was 6,400. Differential count demonstrated: neutrophils 71 per cent., small mononuclears 22 per cent., large mononuclears 6 per cent., transitionals 2 per cent., basophils 1 per cent, eosinophils none. Urine examination disclosed: acid, specific gravity 1.018, faint trace of albumin, no sugar and no acetone. Microscopically, occasional hyaline casts were seen.

Diagnostic Comment.—The patient was exhibited at one of the meetings of the Chicago Dermatological Society, and the majority of the members expressed the opinion that the lesion of the lower lip was an epithelioma. The patient's age, the induration and the presence of a hard mass of glands in the submental region favored this diagnosis. However, the presence of a second ulceration near the angle of the mouth separated by an area of normal mucous membrane and of a third ulcer of the buccal mucosa was not entirely consistent with this view. Smears and scrapings were made from the ulcers in the mouth, stained with Ziehl's stain and showed large numbers of acid-fast bacilli—short thin rods of granular type, morphologically identical with tubercle bacilli. The diagnosis of tuberculosis of the lip with tuberculous ulcers of the mouth was further substantiated by the results of the biopsy. What appeared to be merely an edema of the lip proved to be a solid tuberculoma.

Histologic Examination.—Two pieces of tissue were removed for histologic study, one from the ulcer of the mouth and a wedge-shaped piece of tissue from the vermilion border of the lip. In addition to the usual stains, special stains for acid-fast bacilli were made. The lesion from the lip showed the epidermis to be normal or slightly thinned in part of the section, with the stratum granulosum intact. In other areas, there was extreme acanthosis, irregular down-growth of rete pegs, intracellular and extracellular edema of rete cells and infiltration with leukocytes.

The corium showed intense edema and dilatation of lymphatics and capillaries. Numerous cell masses were present in the middle and subpapillary layers. The cellular infiltration was composed of isolated and conglomerate tubercles of varying size with characteristic arrangement of giant cells, epithelioid cells and small round cells. Giant cells were numerous, oval or round, with ten to twenty peripherally arranged nuclei corresponding to Langhans' type. There was a tendency to conglomeration of tubercles around the vascular channels with an inflammatory zone around the cell groups. There was no tendency to coagulative necrosis of the center of the tubercles as seen in lupus. The collagen was edematous and stained poorly with eosin. The blood vessels were dilated with swollen endothelium. Ziehl's stain showed scanty numbers of tubercle bacilli in the corium. The histologic examination of the lesion from the floor of the mouth showed absence of the epidermis, a diffuse cellular invasion of the corium with relatively few giant cells and no definite arrangement into tubercles, but large numbers of acid-fast bacilli, many of them in clumps.

Treatment and Subsequent Course.—The patient was placed on a general tuberculous regimen, a high protein diet and cod-liver oil internally. Locally a cocain ointment was used on the lip to relieve the pain, and the ulcers in the mouth were swabbed several times daily with diluted hydrogen peroxid. Filtered Coolidge treatments were administered over the lip and submental region. In

the course of six weeks, the swelling of the lip had diminished appreciably in size, and the ulcerations in the mouth had healed. The patient had gained in weight, but his general condition was still poor, and after several months he disappeared from observation.

GENERAL REVIEW OF THE SUBJECT OF TUBERCULOSIS OF THE LIP

The occurrence of tuberculous ulcers of the mouth and lips of the miliary type in advanced cases of phthisis has been known for a long time through the observations of Jarisch,[4] Chiari[5] and especially Kaposi.[6] Among more recent reports of cases involving the lips are those of Plichon,[7] Schuchardt,[8] Morestin,[9] Thibièrge, Hallopeau and

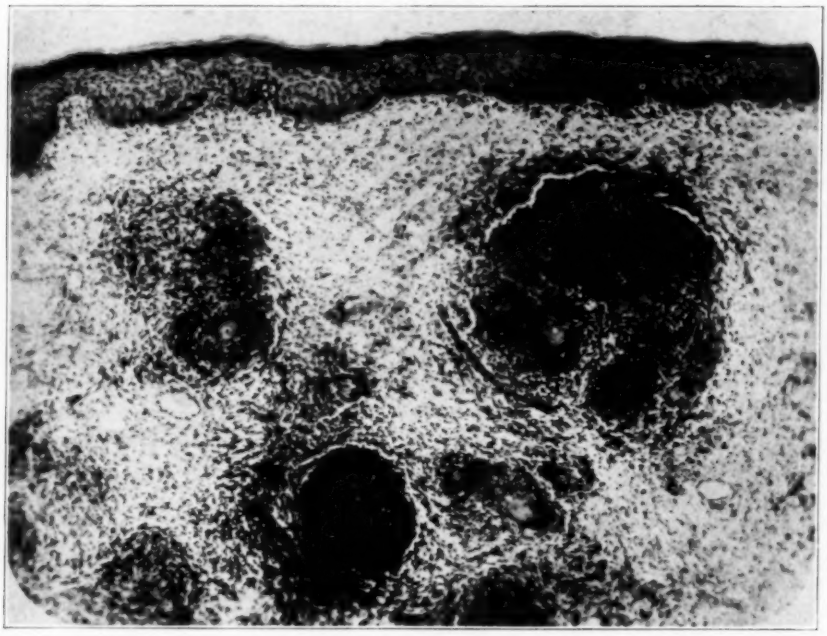

Fig. 3.—Low power photomicrograph showing isolated tubercles in the corium.

Ribot,[11] Münter[12] and others. These cases have been reported under various titles, as tuberculosis cutis vera, tuberculosis ulcerosa, tuber-

4. Jarisch: Arch. f. Dermat. u. Syph., 1879, p. 265.
5. Chiari: Arch. f. Dermat. u. Syph., 1879, p. 269.
6. Kaposi: Arch. f. Dermat. u. Syph. **43**:373, 1898.
7. Plichon, M.-E.: Tuberculose des lèvres, Paris, 1888.
8. Schuchardt: Deutsch. med. Wchnschr. **15**:1073, 1889.
9. Morestin: Bull. et mém. Soc. anat. de Paris **79**:108, 1904.
10. Thibièrge: Ann. de dermat. et syph. **8**:286, 1897.
11. Hallopeau and Ribot: Ann. de dermat. et syph. **13**:611, 1902.
12. Münter: Berl. klin. Wchnschr. **49**:1495, 1912.

culosis cutis orificialis and tuberculosis miliaris. The disease is confined to the mucous membrane and skin about the mucous outlets. Kaposi, in his series of twenty-two cases, found the cutaneous part of the lip involved in eight and the mucosa in six. The clinical characteristics of tuberculous ulcers of the miliary type are well known. They are shallow, round or oval in outline, with a pale red base covered with a seroviscid secretion and irregular borders showing miliary nodules. Tuberculous ulcers of the mouth and lips are further characterized by their rapid development, occasional destructive tendency and acute pain. It is rare to see the grouped miliary nodules before they break down. Ulcers form in from three to eight days and spread either deeply or superficially, simulating the breaking down of a gumma or carcinoma. The prognosis is usually grave as most patients are in the terminal stages of tuberculosis. Kaposi found that the outlook was not hopeless in every case, as the ulcers may show a tendency to heal after a certain stage is reached.

Tuberculous ulcers of the mucous membrane of nonmiliary type are not so well known and have been emphasized especially by Jadassohn,[2] Miyahara,[13] Danlos [14] and others. They are atypical, torpid, poorly granulating papillary ulcerations with undermined or heaped-up borders and resemble lupus ulcers. They are more chronic in their course and occur in association with visceral tuberculosis of a less fulminating type. A special variety is called by Jadassohn the chancriform or epitheliomaform type on account of its firmer consistency and the close resemblance to chancre or epithelioma. These tuberculous lesions occur on the lips as the result of exogenous inoculation in certain instances, and are analogous to the tuberculous ulcers of the genitalia, resulting from infection through ritual circumcision, and those around the fingers and nails occurring as a result of accidental inoculation from tuberculous material. In two cases of lesions on the lower lip, Jadassohn was not able to exclude the diagnosis of epithelioma until the histology was studied and tubercle bacilli were found. Miyahara has reported in detail a lesion on the vermilion border of the lower lip in the form of an indurated plaque, 1.5 cm. in diameter. Histologically he found small, sharply defined tubercles in the upper corium along the vein walls and around the lymphatics. Bacillary findings as well as guinea-pig inoculations were positive. A nodule in the cheek also showed a tuberculous structure and was regarded as a lymphogenous metastasis. There were no tuberculous lesions demonstrable elsewhere in the body, and the case was regarded as probably

13. Miyahara: Arch. f. Dermat. u. Syph. **111**:305, 1912.
14. Danlos: Bull. Soc. franç. de dermat. et syph. **10**:12, 1899.

the result of exogenous inoculation. The second case was a chancriform tuberculosis of the lip in a child of 9 years. On the middle of the upper lip was a crust-covered ulcer, 0.5 by 3.25 cm., with some infiltration. Excision showed tuberculous structure with sparse bacilli. Later the child died of pulmonary and meningeal tuberculosis. Danlos, Münter and others have also reported tuberculous ulcers of the lip which resembled chancre. Many of the cases reported in the literature (Fleming, Bamberger, Paget, Spitzer, etc.) have been mistaken for epithelioma on account of the firm consistency of the border and base and the granular surface of the ulceration. The case here reported resembled more the epitheliomaform type of Jadassohn and was rather unusual in that it represented a solid tuberculoma of the entire lower lip with ulcerations of the buccal mucosa.

The pathogenesis of tuberculous lesions of the lip as well as other portions of the mucous membrane presents several possibilities. There may be a local infection of the lip from without, as in Miyahara's case, and a dissemination to other organs from this source. A rare possibility is a simultaneous infection of the mucous membrane and other viscera. The most probable mode of infection is a primary respiratory infection with secondary involvement of the lip by autoinoculation or hematogenous infection. The lesion of the lip represents in most instances a direct infection of the tissues through a fissure or break in the mucous membrane. In the case here reported, the presence of carious teeth and infected gums in the lower jaw gave a clue to the possible mode of entrance of the bacilli. The extraction of teeth has been known to be followed by mucous membrane tuberculosis and involvement of the alveolar process and regional lymph glands.

The diagnosis of tuberculosis of the lip rests largely on the clinical characteristics of the ulcers, the absence of the cartilaginous induration of most chancres and epitheliomas, the negative spirochete examination and the presence of acid-fast bacilli in smears or scrapings. When bacilli are not found, a biopsy will settle the diagnosis. In the miliary ulcerations the histologic picture will show chronic granulation tissue with few giant cells and an abundance of bacilli. The nonmiliary type has a histology resembling Boeck's miliary lupoid with sharply defined tubercles in the middle and upper corium with bacilli in scanty numbers. The typical arrangement of central giant cells, epithelioid and small round cells is found in these cases, whereas cheesy degeneration is absent. Guinea-pig inoculations may also be made in doubtful cases.

The treatment of tuberculous ulcers of the mouth includes the general treatment of the visceral infection, local use of antiseptic mouth

washes and local anesthetics for the relief of pain. Fifty per cent. lactic acid has been recommended as a cauterizing agent. Curetting or excision might be resorted to in favorable cases. The roentgen-ray and Finsen light have also been used. The prognosis depends on the extent of the visceral involvement.

CONCLUSIONS

1. The case here reported represents an unusual instance of solid tuberculoma of the lower lip with ulcerations of the buccal mucosa associated with a chronic pulmonary tuberculosis of the fibroid type.

2. Tuberculosis of the lip must be differentiated from chancre and epitheliomatous ulcerations.

3. A positive diagnosis rests on the finding of tubercle bacilli and the characteristic histology.

XVII.—EPITHELIOMAS DEVELOPING ON LUPUS ERYTHEMATOSUS

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While the development of epitheliomas on lupus erythematosus has been reported by a number of writers, it has always been with emphasis on the rarity of this condition. Four cases of carcinoma on lupus erythematosus, appearing on the service from which the subjects of these studies are drawn, should be added to those so far reported. Because of the nature of a skin and cancer clinic, where these patients, with the exception of one, presented themselves because of carcinoma, any conclusions as to the frequency of carcinoma on lupus erythematosus must be of questionable value. During the past ten years, 110 cases of lupus erythematosus appeared, including the four of this report, making the incidence of the occurrence of carcinoma on lupus erythematosus 3.6 per cent. at this clinic.

In an excellent exposition, Pringle [1] refers to previous reports of cases. His own report, however, is most complete.

From the chronicity of lupus erythematosus and the prolonged irritation from treatment, one might expect the resulting continuous trauma to lead to frequent development of carcinoma on such a favorable base. Wolbach has shown, in his work on carcinoma after roentgen-ray dermatitis, that a period of from eight to ten years is required for the development of carcinoma, and that the principal change is primarily vascular. All traumas when sufficiently prolonged are potentially a carcinoma stimulus, so that lupus erythematosus with its years of chronic inflammation is, therefore, a field containing potential carcinoma and should be so considered.

Possibly because a patient has for years reconciled himself to, or acquired a tolerance for, the personal discomfort of a chronic lupus erythematosus the added appearance of epithelioma fails, for some time at least, to arouse him to seek further relief, and in many cases the condition goes on to a fatal ending without further diagnostic differentiation. We must conclude from cases already reported and

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* Studies, reports and observations from the dermatological department of the Barnard Free Skin and Cancer Hospital and the School of Medicine, Washington University, St. Louis, Mo., U. S. A., service of Drs. M. F. Engman and W. H. Mook.

1. Pringle: Multiple Epitheliomas Developing on Lupus Erythematosus, Brit. J. Dermat. **12**:1 (Jan.) 1900.

from those in this report, that multiple epitheliomas, with a rapid spread of the cancerous disease when on a lupus erythematosus base is the rule, and that the prognosis is not promising; also that factors before mentioned—the attitude of the patient, failure of proper differential diagnosis and rather rapid fatality—probably tend to prevent more frequent notation of the occurrence of this condition.

REPORT OF CASES

CASE 1 (Fig. 1).—N. H., aged 82, a white woman, was first seen Nov. 10, 1917. At that time she gave a history of lupus erythematosus for the past

Fig. 1 (Case 1).—Extensive lupus erythematosus scarring and carcinomatous lesion.

twelve years. The entire face was covered with the resulting scar. Four or five months ago a small pimple appeared on the right cheek, near the angle of the mouth. This soon showed signs of growing, according to the patient. Now there is a deep ulcerated lesion about 0.5 cm. deep and 4 cm. in diameter, with a well defined, nodular, pearly border. The glands of the neck are much involved.

Because of the patient's age and generally poor physical condition she was treated with the roentgen ray only. There was no improvement when the patient passed from supervision Dec. 7, 1917. She died Dec. 25, 1917 (cause unknown).

CASE 2.—H. B., aged 60, a white man, gave a history of lupus erythematosus beginning twenty-five years ago on the left cheek. He said it did not "trouble or bother" him much until recently, and after he had applied blue vitriol. At

Fig. 2 (Case 3).—Epithelioma on lupus erythematosus.

this time, May 17, 1915, examination showed an erythematous scarred lesion on left cheek 2.5 cm. wide and 5 cm. long. There was some crusting and scaling within the lesion, and where the scales were raised, small projections were seen extending down into the follicles. No positive carcinomatous lesions were observed. Treatment consisted of salicylic and zinc oxid salves, with recommendation for roentgen-ray treatment for which the patient failed to return.

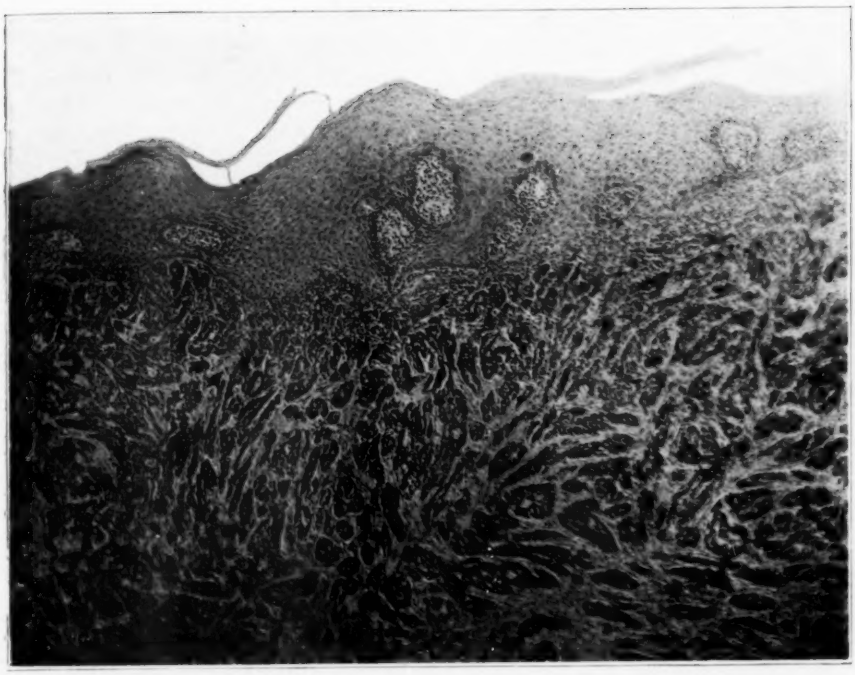

Fig. 3.—Low power section from Case 3.

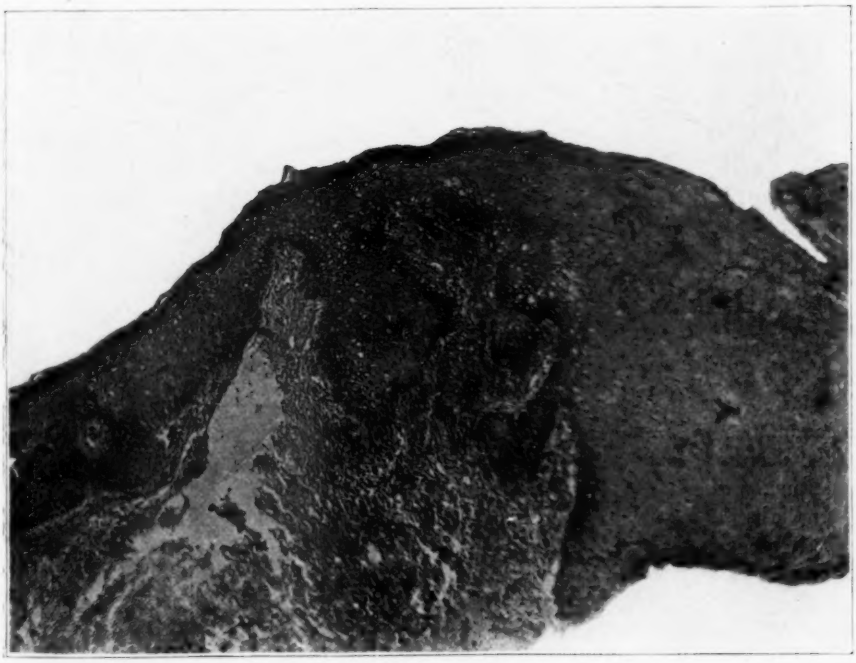

Fig. 4.—High power section from Case 3 at beginning of cancerous area.

On June 6, 1919, the patient returned to the radium clinic in answer to follow-up cards. He had been using only local treatments of various salves. There was now a red, smooth scar, with numerous small pearly nodules along the border, evidently epitheliomas. The patient was given one radium application and then disappeared from our observation.

Case 3 (Fig. 2).—T. D., aged 60, a white man, was treated May 29, 1908, for a lupus erythematosus on the face. He gave a history of twenty-four years' duration of the disease and insisted that it began in a razor cut. The patient did not return again for several years. On Feb. 9, 1915, he again

Fig. 5 (Case 3).—Numerous recurrences.

reported, and at this time the whole of the left cheek was involved in an eczematous ulceration, which was undergoing epitheliomatous degeneration and had destroyed part of the left ear. An ulcer at the angle of the left jaw was distinctly of the rodent ulcer type. There were some senile keratotic lesions on the right cheek and on the backs of both hands. The patient was treated with roentgen ray and at intervals with applications of Lassar's paste, xeroform and silver nitrate salves. There appeared to be slow but gradual improvement. Oct. 14, 1915, the lesion was curetted and skin grafted successfully. The microscopic diagnosis of the curettement was: basal cell carcinoma of the face.

Dec. 8, 1916, the wound had healed with the exception of a very small ulcer on the skin.

On Oct. 24, 1918, the patient again returned after a considerable lapse of time. There were now two ulcers on the left lower lip 4 mm. in diameter, several minute ulcers on the left temple and one behind the right ear, about 3 mm. in diameter. In the anterior part of the old scar there was an ulcerated area with rolled edges and irregular nodular floor, measuring from 2.5 cm. below the mucocutaneous margin of the lower lip, down on the midline of the neck to the thyroid cartilage and from the midline of the neck 4 cm.

Fig. 6 (Case 4).—Epithelioma on lupus erythematosus.

to the left. This the patient says has "gradually grown from a small scab." The glands on the right side of the neck were palpable. The patient was again referred for roentgen-ray treatment. Up to Dec. 9, 1918, there was no improvement; the ulceration measured 5 by 10 cm. on the neck and under the chin. The edges were sharp, nodular and pearly. Cautery and radium treatment appeared to effect some improvement. Improvement progressed so that the patient stayed away for a period of nearly eleven months.

On Nov. 10, 1919, he was again seen and at this time biopsy again brought out a diagnosis of basal cell carcinoma of the face. Figures 3 and 4 are microphotographs of sections made at this time. Microscopically these show the

lesion to be typical basal cell carcinoma. In the scar area, where no cancerous tissue is found, the section shows only an atrophic cicatricial condition; there is marked increase of fibrous connective tissue in the corium with total disappearance of all normal follicular or glandular structure. The epidermis shows a rather wider than normal stratum granulosum, though all the cells are not well defined and have large deeply staining nuclei, showing only a slight tendency to keratinization. The papillary layer between the epidermis and corium is wholly lost.

As one approaches the carcinomatous area there is an irregularity and thickening in the basal cell layer; at the edge of the carcinoma the irregularity of arrangement of the basal cells increases and there are papillary down-growths that show clearly the infiltrating character of the carcinoma. There is increased vascularity with some small round cell infiltration about this area of new growth induced, no doubt, largely by the active process of necrosis in the center of the lesion rather than being primary or coincident only to the new growth.

When last seen this patient showed numerous recurrences and metastases (Fig. 6).

Case 4.—W. D., aged 41, a white man, has had lupus erythematosus for the past twenty-four years, involving the butterfly area of the face. Following injury to the nose by a tree branch two months ago, the patient noticed growth beginning at the site of the injury. At this time examination of the patient showed typical lupus erythematosus scarring on the nose and cheeks, and on the ridge of the nose there was a verrucous appearing lesion, raised about 6 mm., and its size was about 3.5 by 2.5 cm. The edges were sharply limited with a nodular pearly border.

The patient was given radium application, and on May 25, 1920, there was apparently a complete disappearance of the cancerous lesion.

ERYTHEMA NODOSUM AND TUBERCULOSIS

REPORT OF A CASE TERMINATING IN TUBERCULOUS MENINGITIS, WITH NECROPSY

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In 1914, Foerster [1] summarized the literature on the association of erythema nodosum with tuberculosis, laying special emphasis on the association of the cutaneous picture with miliary tuberculosis in childhood. He mentioned in particular the reports of Pollak,[2] Dunlop,[3] Abt,[4] and Sezary,[5] of patients who had died of tuberculous meningitis in close sequence to an attack of erythema nodosum. Such a clinical sequence implies a hematogenous distribution of tuberculosis bacilli; and yet the outstanding fact of the literature has been the failure of the majority of efforts to demonstrate the presence of bacilli by inoculations either from the blood stream or the tissue of the nodose lesions. Of the numerous investigators who have attacked this problem only Brian,[6] Hildebrandt,[7] and Landouzy [8] claim positive results.

Schönfeld's [9] study of thirteen cases of tuberculids, undertaken under Zieler's [10] direction, secured only negative results. It was impossible to obtain the bacilli from the blood stream or to demonstrate

1. Foerster, O. H.: The Association of Erythema Nodosum and Tuberculosis, J. A. M. A. **63**:1266, 1914.

2. Pollak, R.: Erythema nodosum und Tuberkulose, Wien. klin. Wchnschr. **25**:1223, 1912.

3. Dunlop, J.: Erythema Nodosum and Tuberculosis, Brit. Med. Jour. **2**:120, 1912.

4. Abt, I. A.: Erythema Nodosum, J. A. M. A. **43**:1454, 1904.

5. Sezary, A.: Erythème noueux et méningite tuberculeuse, Gaz. d. hôp. **85**:125, 1912; Erythema Nodosum and Tuberculous Meningitis, Med. Press & Circ., N. S. **94**:32, 1912.

6. Brian, O.: Untersuchungen über die Aetiologie des Erythema nodosum, Deutsch. Arch. f. klin. Med. **104**:272, 1911.

7. Hildebrandt, W.: Zur Aetiologie des Erythema nodosum, München. med. Wchnschr. **54**:310, 1907.

8. Landouzy, L.: Erythème noueux et septicémie a bacilles de Koch, Presse méd. **21**:941, 1913.

9. Schönfeld, W.: Experimentelle Untersuchungen zur Frage des Vorkommens virulenter Tuberkelbazillen in der Blutbahn bei Hauttuberkulosen nach diagnostischer Tuberkulinanwendung und unter anderen Bedingungen, Arch. f. Dermat. u. Syph. **126**:651, 1919.

10. Zieler: Demonstration, Fall 13, München. med. Wchnschr. **61**:450, 1914; Vorstellung, Fall 3, ibid., p. 1480.

their presence by inoculation. Schönfeld refers to Zieler's case, an abstract of which follows:

REPORT OF CASES

ZIELER'S CASE.—A girl, aged 24, with no clinical signs of tuberculosis, came under Zieler's observation July, 1913; she had a high fever and an acute erythema nodosum. From this attack she made a good recovery, but in September of the same year a tuberculous nodule appeared in the skin of the left eyebrow and a scrofuloderma-like lesion on the tip of the nose. For another three months the patient remained in excellent health. She then began to complain of backache. Simultaneously pulmonary signs of tuberculosis appeared, the patient became febrile and March 15, nine months after her erythema nodosum, she died of miliary tuberculosis. Necropsy showed that the miliary dissemination had occurred about three weeks before death. A large number of blood inoculations and 400 serial sections from the tissue of a nodose lesion failed to demonstrate the tuberculosis bacillus by the methods of Ziehl and Much.

The patient observed by me supplies further clinical evidence, though no conclusive proof, for the belief that erythema nodosum may in some cases be of purely tuberculous etiology.

CASE 259600.—A young girl, 19 years of age, came to the clinic complaining of an eruption over the shins and knees associated with rheumatism so severe she could scarcely walk. The process was of one week's duration. To the date of first examination the lesions had shown no tendency to the usual involution with color changes.

The patient gave a definite history of exposure to tuberculosis in the person of an older sister who had recently died of the disease. The patient herself had always been well until the week during which the nodose lesions appeared. Since then she had lost weight and had a cough for two weeks with no expectoration and no fever.

At the time she presented herself her afternoon temperature was 100. The physical examination of the chest and the roentgenogram were negative, the urine was normal, and the serum Wassermann reaction was negative. A search for a clinically demonstrable focus of septic infection was negative. The appendix had been removed four years before and the tonsils three years before. There were no palpable glands, and the teeth were normal except for a slight pyorrhea. One feature of the erythema nodosum which deserves special note is its failure to show the usual hemorrhagic changes and the peculiar purplish or bluish tinge of the individual nodes and plaques.

Under rest in bed and the administration of salicylates the patient made a definite improvement and was dismissed with instructions to continue medication and to return later for observation.

Twenty-two days after the patient's first examination and twenty-nine days after the first appearance of the erythema nodosum she developed a stiff neck, and in rapid succession the symptoms of a fulminating tuberculous meningitis appeared. Death occurred seven days later, thirty days after the onset of the erythema nodosum. Examination of the spinal fluid one day before death showed that the Wassermann and Nonne reactions were negative; there were forty-two lymphocytes and tuberculosis bacilli in small numbers. Necropsy disclosed an extensive recent miliary tuberculosis involving all the viscera,

including the myocardium, with a primary focus apparently in the peribronchial lymph nodes. A careful study of the tuberculous process showed the oldest lesions to be of approximately three to four weeks' duration. No signs of a septic focus of any description could be found in the entire body.

Histopathologic examination of a bluish patch over one of the tibiae showed the essential lesion to be in the muscle and to consist apparently of a simple necrosis with practically no evidence of inflammatory reaction. The tissue could not be stained successfully for tuberculosis bacilli, but nothing to suggest the histologic architecture of a tuberculous process could be identified.

DISCUSSION

The outstanding features of interest in this case are:

1. Absence of clinical evidence of tuberculosis when the patient presented herself with rheumatoid symptoms and erythema nodosum.

2. The apparently exact correspondence of the onset of erythema nodosum with the time of generalization of the tuberculous infection as estimated by the age of the tubercles found at necropsy.

3. The complete absence both in life and at necropsy of the septic foci responsible for erythema nodosum of the streptococcal or Rosenow [11] types.

It may not be amiss to suggest that one of the reasons why attempts to isolate the tuberculosis bacillus from the blood of patients with tuberculids and erythema nodosum are so conspicuously unsuccessful in spite of the strong clinical evidence for hematogenous distribution, is the time at which such inoculations are attempted. The moment at which the tuberculous bacteremia is at its height may reasonably be expected to precede the appearance of the lesions that give the clue to the condition by several days or even longer. The investigator who attempts to demonstrate the organism by blood inoculation into animals during the febrile stage of erythema nodosum is probably too late. The febrile reaction represents the response of the body to tuberculosis bacilli securely lodged in the tissue rather than still at large in the blood stream. The conclusive demonstration of a tuberculous bacillemia must depend on the opportunity to use a large number of animals in the study of a single patient suffering from recurrent attacks of a tuberculid in which the possibility of a pyogenic focal element has been entirely eliminated. The difficulty in securing such a combination of circumstance and opportunity will probably long delay the conclusive demonstration of the tuberculous etiology of certain types of erythema nodosum. In the meanwhile, the search for organisms should be directed toward the earliest recognizable lesion rather than toward mature lesions in which the inflammatory reaction perhaps has destroyed the bacterial embolus.

11. Rosenow, E. C.: The Etiology and Experimental Production of Erythema Nodosum, J. Infect. Dis. **17**:367, 1915.

STUDIES ON ALBUMINURIA AND EOSINOPHILIA IN SCABIES*

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The association of albuminuria with scabies has been a matter of interest, speculation and investigation for over a hundred years. Although it would seem that so simple a matter could be easily and finally settled, yet the results of investigation by different authors vary greatly, not only as to its frequency and severity, but even to its actual occurrence.

LITERARY REVIEW

Posner [1] found albumin in the urine of all scabies patients with his reagent. Spiegler, quoted by Hubner, also came to the same conclusion; but Hubner [2] showed that these observers had used a reagent that gave a positive reaction from dilutions of 1: 50,000 at least, and for which, as even Spiegler himself remarked, it was difficult to find albumin free controls. The reagent was also positive with peptone albuminoses and nucleo-albumins. Hubner found albumin in the urine of forty-seven out of fifty scabetic patients with Spiegler's reagent, but in only two with the ordinary clinical tests.[3] He believed that clinical tests would show an albuminuria in scabies patients only when there was some "circulatory cause," such as infection or fever.

Probably the most extensive series of cases reported was that by Nicholas and Jambon,[4] who found albuminuria in sixteen out of 101 untreated cases with the ordinary clinical reagents. It appeared only after the disease had lasted for some time—one to two months or more in their cases. They, with Hubner, also insisted on some "predisposing factor," namely, a special sensitiveness of the kidneys so that the slightest irritation sufficed to bring on the condition.

The scabic albuminurias, according to Nicholas and Jambon, may be divided into two classes: (1) a slight transient albuminuria generally improving when sulphur treatment is begun, and usually much

* From the Laboratory of Dermatological Research, Department of Cutaneous Medicine, University of Pennsylvania.

1. Posner: Virchows Arch. f. path. Anat., 1886, p. 114.

2. Hubner, H.: Ztschr. f. klin. Med. 1904, p. 549.

3. We have not been able to locate the formula for Posner's reagent. That of Spiegler's is as follows: $HgCl_2$, 8 gm.; tartaric acid, 4 gm.; glycerin, 20 gm.; water, 290 gm. In applying the test, acidulate the urine with acetic acid, filter and overlay with the above reagent.

4. Nicholas and Jambon: Ann. de dermat. et syph. **9**:65, 1908.

diminished or even disappearing in twenty-four hours; (2) a true "nephrite scabique" showing all the clinical signs of a real nephritis in contradistinction to a simple albuminuria. The latter condition occurred in two of their sixteen cases; at least one patient gave a definite history of having had an acute nephritis before. The past medical history of the other was not clear. Albuminuria did not seem to be dependent on the severity of the infestation, but when it occurred it was always in generalized cases. The presence of pustules did not have much influence, for only five of their fourteen cases of albuminuria showed them.

AUTHORS' STUDIES

Our data are based on the examination of forty-nine patients. Practically all were uncontrollable outpatients, so that consistent repeated examinations were not practicable.

Some of the cases as usual were complicated by the suppuration of secondary infection. At the time of urinalysis thirty-five of the forty-nine patients had not yet received treatment. The remaining fourteen had received three or four sulphur rubs on four consecutive nights, with the exception of two patients who will be referred to later. In collecting urine the usual care was taken to avoid contaminating discharges. The tests used were the three common clinical ones, i. e., acetic acid and heat, nitric acid, and Roberts' reagent.

As regards the whole series of forty-nine cases, albumin was found in ten, 20.4 per cent. Of these the urine in only one case showed a cloud, and this was light. The other nine cases showed a "very faint trace," i. e., albumin could be seen only when the tubes were held in the most advantageous position and light. Albuminuria was equally divided between males and females. The latter patients' ages ranged between 3 and 20 years, and 50 per cent. of the patients were under 10 years of age.

Of the thirty-five untreated patients, six showed albumin, 17.1 per cent. In the fourteen treated patients, four showed albumin, 28.5 per cent. The medicinal history of these four was that two had had sulphur rubs for six consecutive days (at their own instance), one had been taking a patent "blood medicine" and the fourth had taken three sulphur rubs and was using a phenol wash. In all cases (five) in which subsequent urinary examinations were made, the albumin had promptly disappeared.

Of the patients showing albumin, all had a generalized eruption of the hands, arms, legs and trunk. None showed any special or peculiar type of lesion, nor were pustules especially in evidence. In fact they were more conspicuous by their absence.

Therapeutic measures appear to increase the incidence of albuminuria. Thus in our series the percentage jumped from 17.1 per cent. (without treatment) to 28.5 per cent. when sulphur rubs were employed. With other authors it has even proved serious. Thus Thibierge [5] reports that 95 per cent. of the patients treated with "Dutch soap" (Schmierseife) showed albuminuria. Lassar [6] reports a death from the use of petrolatum over the entire body for four successive days. The patient developed an acute nephritis with edema. Of 124 patients rubbed with styrax, Unna [7] reported definite kidney irritation in nine cases. Balsam of Peru will also produce albuminuria when used even in therapeutic amounts, according to Litten [8] and Hubner.

TABLE 1.—THE OCCURRENCE OF ALBUMINURIA ACCORDING TO DIFFERENT OBSERVERS

Observer	Reagent Used	Number of Patients Examined	Percentage Showing Albumin
Posner	Posner's	...	100
Spiegler	Spiegler's	...	100
Hubner	Spiegler's	50	94
	Clinical*	50	4
Nicholas and Jambon	Clinical	101	16
Hayman and Fay	Clinical	49	20.4

* By clinical reagents is meant acetic acid and heat, or nitric acid.

TABLE 2.—SHOWING DISTRIBUTION OF ALBUMINURIA (AUTHORS' SERIES)

	Number of Patients Examined	Males	Females	Number Showing Albumin
Untreated	35	21	14	6— (17%)
Treated	14	11	3	4— (28%)

In our series albuminuria was slight and transient in all but one case. Hyaline casts were occasionally present in one case. In no case were the urinary findings of clinical significance, and the patients complained of only cutaneous symptoms.

ANIMAL EXAMINATION

We have also examined the urine from three dogs which were "spontaneously" infested with sarcoptic mange. None had received treatment. The first dog was not as seriously affected as the others, and had lost only about one-half of his hair. He did not show albumin at any time. The second dog had been diseased for about

5. Thibierge: Ann. de dermat. et syph., 1895.
6. Lassar: Virchows Arch. f. path. Anat. **72**:132, 1878.
7. Unna, quoted by Hubner.
8. Litten, quoted by Hubner.

four months and had little hair left; at first his urine showed no albumin. A month later, when very weak, his urine was constantly cloudy with albumin. The third dog was also very sick and had little hair left. His urine showed albumin constantly. These findings will be commented on later.

CAUSE OF THE ALBUMINURIA

Four possible causes are: (1) a secondary pyogenic infection, (2) the therapeutic measures employed, (3) a preexisting nephritis, and (4) the disease itself.

1. We believe that secondary infection is unimportant since albuminuria occurred independently of pustulation in 100 per cent. of our cases.

2. Therapeutic measures undoubtedly produce albuminuria in some cases, as shown by the higher incidence we obtained in treated cases (23 against 17 per cent). However, Nicholas and Jambon found albumin in 16 per cent. of their untreated cases, and our series showed its presence in 17 per cent.; hence therapeutic measures are not invariably the cause of "scabic albuminuria."

3. Albuminuria occurs in too large a percentage of cases (16 per cent.) to assume that it is always the manifestation of a preexisting nephritis; one-sixth of our dispensary patients do not harbor nephritis. Furthermore, it is too transient to indicate a genuine nephritis. In the more severe cases, however, the "nephritis scabique" of Nicholas and Jambon, a preexisting nephritis, seems more than probable. This condition did not occur among our patients, and of the two cases recorded by Nicholas and Jambon at least one gave a definite history of a previous nephritis.

4. That albuminuria is a manifestation of the disease itself is the opinion of Nicholas and Jambon. They advance four possible factors: suppression of the skin function, toxins of the parasites, resorption of products from cells detached from the skin lesion, and vasomotor disturbances in the kidneys of reflex origin, due to irritation of peripheral nerves at the skin lesions.

We believe that the first three factors may reasonably be eliminated as immediate and exciting causes. The fact that albuminuria occurs in dogs, in whom the excretory functions of the skin are either absent or limited to a small amount by way of the sebaceous glands, points against the suppression of the skin function as a cause of albuminuria. It also seems improbable that it is due to any toxin of the itch mite, for there are too many generalized and long standing cases of scabies that show no albuminuria. The possible absorption of products from detached cells in the cutaneous lesions seems too fanciful to consider

as the burrows are almost without exception in the horny layer of the epidermis where absorption is difficult; also there are great numbers of detached cells on normal skins at all times.

That irritation of the cutaneous nerve ends may cause a reflex hyperemia or inflammation of the kidney is hard to prove but, on the whole, it seems to us to be the most plausible explanation. According to Herbert French,[9] albuminuria occurs in various vasomotor disturbances, such as Raynaud's disease, angioneurotic edema and also occasionally in pemphigus. We appreciate, of course, that in some of these a secondary toxic or infectious factor enters which explains the albuminuria. Along the same lines, Adami [10] calls attention to the fact that irritation of nerve ends may cause a reflex hyperemia or even a reflex inflammation in another part of the body, when this part is supplied by nerves that leave the cord at the same level as those that are irritated enter it.

In applying this principle to the scabic problem and referring to the nervous connections between the skin and the kidneys, we find that:

1. The nerves to the kidney are derived from the renal plexus.

2. The renal plexus in turn receives contributions from (*a*) the aortic plexus, (*b*) the solar plexus and (*c*) the least splanchnic nerve.

3. As far as peripheral cutaneous communication with the last three are concerned, they are limited to (*a*) the aortic plexus, between the tenth and the eleventh dorsal ganglions; (*b*) the solar plexus, from the ganglions between the fifth and ninth dorsal segments and from the right vagus; (*c*) the least splanchnic from the twelfth dorsal ganglion.

An inspection of these peripheral communications shows that all are truncal, and not immediately with the extremities in any case except one. This peripheral communication is the one from the right vagus, which gives a cutaneous branch to the right cervical region (which scabies does not attack, and with which we are therefore not concerned). This observation shows first, that sufficiently direct communications obtain between the skin and kidneys to make a reflex hyperemia possible; secondly, it links up suggestively with our findings that the albuminuria in our series of cases occurred only in generalized cases; that is, in cases in which the trunk is involved. Cases limited to the hands and arms, in which there were numerous

9. French, Herbert: Index of Diagnosis, New York, William Wood & Co., 1918.

10. Adami: Textbook of Pathology, New York, Macmillan Co., 1918, p. 84.

lesions of long standing and considerable inflammation of the parts, showed no albumin, while 20 per cent. of the cases with a generalized eruption, even if there were few lesions on the trunk, showed albuminuria.

Reflex irritation best surmounts the apparent impasse of why albuminuria appears in some generalized cases and not in others, even when the conditions appear identical, for it is reasonable to suppose that some economies are more sensitive to reflex reactions than others. We realize that speculative conclusions are on the whole generally unsatisfactory, and we make these statements as a theory rather than as a finality.

IMPORTANCE OF ALBUMINURIA

Although the presence of albuminuria in scabies is of considerable scientific interest and the method of its production a fruitful field for thought and experiment, it can hardly be of clinical importance. It is generally known that a simple albuminuria without the presence of casts occurs under a great variety of circumstances—exposure to cold, severe exertion, a heavy meal rich in proteins, etc. Such albuminurias, together with those that are accidentally discovered in young men in apparently robust health, which disappear after rest in bed and are not constantly present, are generally classed as psysiologic, functional or accidental. We believe that the albuminuria of scabies belongs to this group.

CONCLUSIONS

1. A slight transient albuminuria occurred in 17.1 per cent. of the untreated scabies cases in our series. It occurred only in generalized cases. Probably, as suggested by Nicholas and Jambon, some special predisposing kidney irritability is present in these cases.

2. There is no evidence that an actual nephritis or kidney irritation of any clinical significance is produced by the disease itself. If such a condition occurs, it must be exceedingly rare.

3. The use of even mild therapeutic measures greatly increases the incidence of albuminuria, and some measures may lead to serious results.

EOSINOPHILIA

The presence of a slight but definite eosinophilia in scabies is much better established than albuminuria, although not accepted by every one. Kolmer,[11] in a series of eighteen children, found a mild leukocytosis, and an eosinophilia varying from 3 to 11 per cent. Two thirds of the cases reached 5 per cent. or over and the average for the series was 5.79 per cent. Noninfested children of the same age showed

11. Kolmer, J. A.: Jour. Cutan. Dis. 1911, p. 339.

2.73 per cent. of eosinophils. The eosinophilia was in general proportional to the severity of the infestation, was highest during the acme of the eruption, and gradually reached normal proportions as the disease disappeared.

Schamberg and Strickler,[12] in the examination of the blood of forty-seven scabetic patients, found that thirty-eight, or 80 per cent., showed 5 per cent. or more of eosinophils. The maximum count was 19 per cent.

Ewing[13] comments that the various cutaneous diseases have furnished some of the most marked and interesting examples of eosinophilia. It has been shown by Canon[14] and verified by Zappert[15] that the eosinophils are affected not so much by the special forms of the cutaneous lesions as by the extent, intensity and lack of healing tendency of the lesions.

Herbert French,[16] after the study of the blood in ninety patients with various skin diseases, dissents from the generally accepted statement that eosinophilia is common in various acute and chronic cutaneous disorders. He found eosinophilia only thirteen times in the ninety patients, and in only four cases was it marked. In his seven cases of scabies the average eosinophil count was only 1.6 per cent., the highest 6.6 per cent. and the lowest 0.1 per cent.

TABLE 3.—Showing Grouping of Cases According to Percentage of Eosinophils

Eosinophils	Number of Cases	Percentage of Total Number of Cases
3% or less	12	21.8
3–5%	11	20.0
5–7%	12	21.8
7–10%	17	30.9
10% or more	3	5.4
Total	55	99.9

We have examined the blood of fifty-five scabies patients in the dermatologic dispensary of the University Hospital and in the dermatologic wards of the Philadelphia General Hospital. Thirty of the patients were males and twenty-two females, and the ages ranged from 3 to 30 years. Our counts gave a maximum of 15 per cent. and a minimum of 1 per cent; the average was 5.5 per cent. Table 3 shows how the percentages were grouped. Thirty-two cases, or 58

12. Schamberg and Strickler: Jour. Cutan. Dis. **30**:53, 1912.
13. Ewing: Clinical Pathology of the Blood, Philadelphia, Lea & Febiger, 1918.
14. Canon: Deutsch. med. Wchnschr. **18**:206, 1892.
15. Zappert: Ztschr. f. klin. Med. **23**:227, 1893.
16. French, H.: Guy's Hospital Rept. **58**:81, 1904.

per cent., showed 5 per cent. of eosinophils or more, while twenty of these, or 36.6 per cent. of the series showed 7 per cent. of eosinophils or more. The higher percentages came from more extensive infestations, the low or normal counts either in very recent cases, in which symptoms had been noted for only two or three days, or else in light infestments. The presence of pustules did not seem to be a factor. The eosinophilia increased with the extent of the disease and disappeared promptly as the disease was cured.

The observation of Leredde,[17] that in dermatitis herpetiformis and the various forms of pemphigus there is not only a hemic eosinophilia but an enormous outpouring of these cells into the cutaneous lesions, prompted the question whether this occurred in scabies also. We determined the eosinophil percentage of blood drawn from a finger and that from the neighborhood of a burrow or papule in five patients. The average difference was 0.3 per cent. In two cases the percentages were the same; in one the hemic (finger) count was less, and in two it was slightly greater. The difference is thus too slight or variable to be of any importance.

CONCLUSIONS

1. Scabies is accompanied by a slight but definite eosinophilia, the degree of which is, in general, proportional to the extent of the infestation.

2. There is no increase of blood eosinophilia in the neighborhood of the cutaneous lesions.

3. Being so variable in itself and so common in other skin conditions, eosinophilia is not useful in the differential diagnosis of scabies.

17. Leredde: Prat. dermat. **2**:527, 1902; Ann. de dermat. et syph., 1898, p. 1016; Monatschr. f. prakt. Dermat. **27**:381, 1898.

PITYRIASIS RUBRA PILARIS

REPORT OF A CASE CURED BY THYROID EXTRACT

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INTRODUCTION

It is our desire and purpose to report a case of pityriasis rubra pilaris (Devergie) apparently cured by the internal administration of thyroid substance. Thyroid substance has been advocated therapeutically in this disease by several authorities; therefore when the patient, whose history is reported, appeared for treatment, it was decided to employ organotherapy in view of certain minor signs of dysthyroidism. With the exception of a 2 per cent. salicylic acid ointment used at the onset for a period of two days, no further measures, either general or local, were employed. We are further emboldened to report this case by reason of the rapid involution occurring, soon after the glandular medication was begun, in a disease generally regarded as pursuing a protracted clinical course and as being unusually resistant to all forms of treatment, either internal or local.

REPORT OF CASE

History.—B. B., a white man, married, aged 61, a native of Russia, a shirtmaker, presented himself in April, 1919, for the treatment of an intensely pruritic eruption. He said that the cutaneous condition began four months prior to his admission to the clinic with a mild itching of the skin of the abdomen. Four days later, a scaliness of the skin of the trunk was noticed which spread rapidly, involving the face and upper extremities, until at the end of ten days, it became generalized. The pruritus was so intense that it interfered with sleep and prevented him from attending to his occupation. Subsequently, the skin became dry, rough and cracked, and about three months after onset, the soles and palms were similarly involved. The condition persisted, steadily growing worse, and treatment received from clinics and private physicians gave no relief.

Inquiry showed that no other member of his family had suffered from any generalized or chronic skin disease, nor was any history of carcinoma, syphilis, tuberculosis or blood dyscrasia to be elicited.

The patient had been married forty years. He denied venereal infection by name or symptom; he had always been well with the exception of the diseases of infancy and childhood and a recurrent winter cough of several years' duration.

His wife was healthy; she was the mother of five children, all living and well. Her labors had been normal and she had had no miscarriages.

General Examination.—The patient was below normal stature, fairly well nourished but poorly developed, and showed difficulty in concentration and a faulty memory. His hair was thin, dry, lusterless and gray. His eyes revealed a marked arcus senilis; the eyelashes were scant; the eyebrows were sparse with the outer halves missing. The teeth were in poor condition; some were missing and the remainder were carious, yellow and showed extensive pyorrhea. The thyroid gland was not visible, nor could it be felt on palpation. The chest was barrel shaped; expanding poorly on inspiration. The spine showed moderate dorsal kyphosis and lumbar lordosis. The lungs revealed small, dry râles scattered throughout both areas. The cardiovascular system showed evidence of poor tone. The heart sounds were weak; a systolic murmur was heard at the apex and not transmitted. The pulse was small and easily compressible; the rate was slow, varying between 60 and 66 beats per minute. The superficial arteries were thickened, distended and sclerotic. Varicose veins were present on the legs and in the scrotum. The pubic hair was of the male type. The Wassermann reaction was negative. The urine was normal with the exception of a trace of albumin (repeated analyses). Biopsy was not permitted.

Dermatologic Examination.—The entire cutaneous surface was dry, scaly and thickened. Covering the whole skin area were innumerable, red, acuminate papules produced by hyperkeratosis in the mouths of the pilosebaceous follicles, which imparted to the touch a rough nutmeg grater-like sensation. Movements of the patient or rubbing of the skin caused showers of fine bran-like scales. The scalp was red and buried under a thick layer of grayish white scales. The hair was dry, lusterless and projected from hard, dark red papules. The skin of the face was red, dry, thickened, moderately scaly and showed the presence of groups of black, follicular papules over both malar regions. The skin of the trunk was also dry and scaly. The characteristic follicular papules were discrete but in places, as over the epigastric and sacral regions, they had also become confluent to form large, red, infiltrated, lichenified, slightly scaly, eczematoid patches. Scattered over the back were about a dozen large pea-sized lesions. These were elevated, covered with dirty, grayish scales and resembled nummular psoriasis. However, these patches differed from those of psoriasis, in that the scales were not of the silvery white color but of a dull, dirty, grayish appearance and when removed showed no bleeding points nor an underlying bright red surface, but a dry, livid, red base.

The skin of the extremities showed the same general characteristics, the eruption being most marked on the extensor surfaces. Psoriasiform lesions were present on both arms and legs, while large eczematoid patches covered the buttocks and thighs.

On the dorsum of the fingers, especially over the proximal phalanges, there were numerous discrete, hard, black, acuminate papules pierced by broken off

hairs and covered with scales. The palms and soles were the sites of a marked tylosis. The epidermis was greatly thickened, hard, almost horny in places, and covered with a thick, dense layer of dirty yellow and grayish scales. The hyperkeratosis extended up the lateral aspects of the hands and feet, being bordered by a narrow erythematous zone. The nails of the fingers and toes were dry, thickened, brittle and discolored. In the regions of the joints were deep, red fissures.

Course and Treatment.—Since pityriasis rubra pilaris is essentially a hyperkeratosis, an ointment containing salicylic acid, 2 per cent., in petrolatum was prescribed in an endeavor to reduce somewhat the thickened, horny layer. Furthermore, it was decided to administer organotherapy because of previous good results obtained with such measures in other keratodermias, especially ichthyosis.[1] Whole thyroid gland tablets, in 1 grain strength, were prescribed three times daily before meals. At the end of two days, the ointment was discontinued in order to demonstrate and test more thoroughly the efficiency of the thyroid medication without any local assistance. Within a week, an improvement was noticed, shown in a diminished tendency to scaliness; new papules did not seem to develop so readily and the older papules, as well as the erythematous patches, had become flatter and less inflammatory.

A note made two weeks after instituting the treatment indicates that the improvement was distinct. Pruritus was slight and the follicular papules were less in number, many having disappeared, while the whole cutaneous surface was smoother and less nutmeg-grater like in character. The scaling was also less abundant; 75 per cent. of the characteristic black acuminate papules had disappeared from the dorsum of the fingers, and the eczematoid patches were less inflammatory and infiltrated.

The patient was presented at a regular meeting of the Manhattan Dermatological Society about three weeks after the treatment was begun and although the clinical picture had altered, it was still sufficiently characteristic to be accepted as an example of pityriasis rubra pilaris.

Under no treatment but that described, improvement continued until at the end of three months the skin showed no positive lesions of the disease, appearing only dry and slightly scaly. The scalp, however, continued to show a thin layer of dry grayish scales.

On request, the patient returned for examination one year after his first visit to the clinic. The skin appeared normal except for a slight seborrhea of the scalp. He stated that he had been taking the thyroid tablets on and off since his discharge from the clinic because of their good effect, not only on his skin, but also on his general condition, both physical and mental.

OTHER REPORTS ON THE THERAPEUTIC ACTION OF THYROID IN PITYRIASIS RUBRA PILARIS

There are several references in the literature concerning the effect of thyroid gland medication in pityriasis rubra pilaris.

Crocker [2] found the administration of thyroid extract a valuable adjuvant to local treatment. He recommended an initial daily dose

1. Forchheimer: Therapeuses of Internal Diseases, New York, D. Appleton & Co. **1**:76.

2. Crocker: Diseases of the Skin, Philadelphia, P. Blakiston's Son & Co. **1**:235.

of 5 grains with a weekly increment according to the tolerance of the patient; he asserted that it was rarely necessary to exceed fifteen grains daily until the cure was effected.

Graham Little [3] reported good results in one case by the administration of thyroid extract in doses of 1½ grains increasing to 3 grains, three times daily. Local treatment was employed simultaneously.

In Stelwagon's [4] case thyroid extract seemed of slight service, but as the external treatment was being carried out at the same time, it was doubtful to which the benefit was due.

Pusey [5] classifies thyroid extract, pilocarpin and protiodid of mercury as remedies that have seemed to be of benefit in some cases.

Ormsby,[6] Sequeira [7] and Sutton [8] quote the article by Crocker regarding the internal administration of thyroid extract.

In Allbutt and Rolleston's "System of Medicine," [9] thyroid extract is mentioned as being tried, with temporary improvement in a few cases.

Schamberg [10] recommends arsenic, mercury, pilocarpin, thyroid extract and tonics as internal remedies to be considered.

Whitfield [11] states that thyroid extract especially has been found of service, but in conclusion remarks that in his own experience nothing is of the slightest benefit and a case of his was unaltered by any form of treatment that has been recommended.

COMMENT

A review of the findings in this case demonstrates the presence of symptoms of hypothyroidism, and the rapid improvement under thyroid therapy warrants a belief that dysthyroidism may play a rôle in the production of pityriasis rubra pilaris. The thyroidal indications presented were: a dull, stupid facial expression with mental changes of a minor character; marked evidence of senility; sparseness of the eyebrows and absence of the outer half (Leopold-Levi and H. de Roth-

3. Little: Brit. J. Dermat. **22**:412, 1900.

4. Stelwagon: Essentials of the Skin, Philadelphia, W. B. Saunders Company, p. 235.

5. Pusey: Principles and Practice of Dermatology, New York, D. Appleton & Co., p. 446.

6. Ormsby: Diseases of the Skin, Philadelphia, Lea & Febiger, p. 337.

7. Sequeira: Diseases of the Skin, Philadelphia, P. Blakiston's Son & Co., p. 473.

8. Sutton: Diseases of the Skin, St. Louis, The C. V. Mosby Co., p. 170.

9. Allbutt and Rolleston: System of Medicine, New York, Macmillan Co., **9**:348.

10. Schamberg: Diseases of the Skin and the Eruptive Fevers, Philadelphia, W. B. Saunders Company, p. 115.

11. Whitfield: Skin Diseases and Their Treatment, New York, Longmans, Greene & Co., p. 199.

schild" eyebrow sign [12]); yellowish, straight, long teeth which were carious and showed extensive pyorrhea; thyroid gland not palpable; relaxation of ligaments (dorsal kyphosis and lumbar lordosis); poor muscular tone (pot-belly); extreme constipation relieved while under treatment; slow pulse; chilliness and a tendency to contract "colds"; a dry, scaly, itchy skin; and finally, the local and systemic benefits derived from the thyroid administration.

Disorders of the thyroid gland are productive of changes in the structure and functions of almost all the tissues and organs of the body. The symptoms which develop may result in well recognized clinical entities like cretinism, myxedema and exophthalmic goiter, or, on the other hand, they may be of such a minor or indefinite nature that their relation to thyroid dyscrasia may not be considered unless one bears in mind the possibility of disturbed endocrine function. The administration of thyroid is therefore justifiable in cases showing minor symptoms of hypothyroidism, and improvement under such therapy should afford a valuable therapeutic test. Even in those cases in which thyroid symptoms are not present, organotherapy should be tried as it has been noted that the effects of thyroid extract on the skin are improved nutrition, increased glandular activity and excretion of waste products, stimulation of hair growths and enhancement in desquamation of an unhealthy, horny skin layer with the reproduction of a new covering. These effects are particularly to be desired in all the general hyperkeratotic conditions like ichthyosis and pityriasis rubra pilaris, which are associated with faulty metabolism.

SUMMARY AND CONCLUSIONS

A report is made of a typical case of pityriasis rubra pilaris occurring in a male adult who revealed more or less definite signs and symptoms of thyroid dysfunction. The skin condition showed rapid improvement and an apparent cure was obtained with thyroid therapy alone. No claim is advanced for the specificity of thyroid extract in the cure of this disease, but it is recommended that organotherapy should be given a trial in the treatment of pityriasis rubra pilaris, and only by further study and careful clinical observations will its actual therapeutic value and effects be definitely determined.

12. Cobb: Organs of Internal Secretions, New York, William Wood & Co., p. 65.

NOTES FROM KALAHI LEPROSY HOSPITAL

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The Kalihi Leprosy Hospital is owned, equipped and conducted by the Territorial Board of Health. It is located three miles from town and comprises five or six acres. The buildings include several dormitories, an infirmary, dispensaries, examination rooms, kitchen, dining rooms, assembly hall and steam laundry, all equipped with hot and cold water and electric lights and a school for children. There are in addition recreation grounds, tennis and volley ball courts, billiard rooms, vegetable gardens, piggery, poultry runs, etc. Adjoining the hospital grounds are the laboratories, library and other buildings of the United States Public Health Service Leprosy Investigation Station, directed by Dr. J. T. McDonald, who is also ex-officio attending physician to the hospital.

On July 10, 1920, there were 117 patients, the majority of whom were Hawaiians—sixty-four females and fifty three males; the oldest patient was 62 years, the youngest 7 years, and the average age was 23 years. It should be stated that as a rule males predominate. On this date none of the patients was bedridden, and they were otherwise in good health. The prevailing spirit is one of hope and cheerfulness, and the morale is excellent. Most of the cases are early types, many of the patients having entered the hospital voluntarily. As a rule the patients remain in the Kalihi Hospital six months, or, if they show marked improvement, for longer periods. At the end of their stay they are either paroled or sent to the Molokai Settlement 50 miles away.

The standard treatment here now is the use of ethyl esters of the fatty acids made from the whole crude chaulmoogra oil in the laboratories of the College of Hawaii, according to methods devised by the president, D. A. L. Dean. This preparation carries 2 per cent. of iodin by weight in chemical combination. The preparation is injected intramuscularly into the gluteal region, the initial dose being 1 c.c. per week, later doses being gradually increased to 5 c.c. or 6 c.c. weekly. The preparation contains all the therapeutic virtues of the crude oil, and is almost as fluid and limpid as water, being entirely absorbed in 24 to 48 hours. Internally, appropriate doses of the mixed fatty acids, carrying 2.5 per cent. iodin in chemical combination, are given in capsules three times a day. The preparation is partly predigested in the

laboratory and rarely causes nausea. In addition to treatment with the above mentioned preparations or modifications of chaulmoogra oil, numerous accessory treatments are used, such as strychnin, iron tonics, arsenous acid, hot baths, liniments, escharotics, unguents, heliotherapy and other treatments.

The results have been encouraging. In the period from Dec. 24, 1918, to July 10, 1920, seventy-eight patients have been paroled from segregation and there has not been a single recurrence.

Among the hospital patients, over 10 per cent. have one or more attacks of leprosy fever with macular eruption, but they soon recover from these acute attacks and are in better condition than they were before.

REMOVAL OF WARTS

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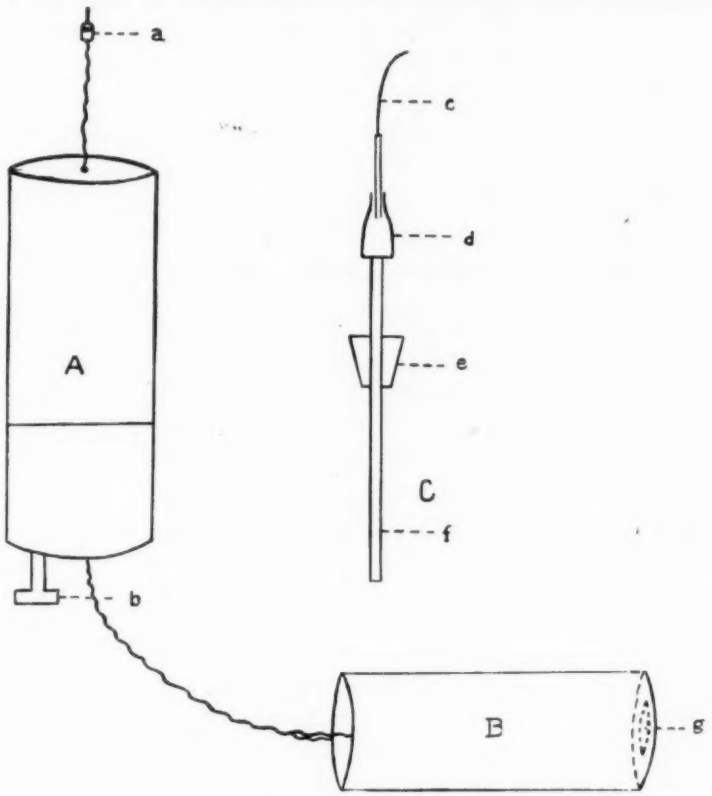
The multiform warts or verruca usually filiform in type, which occur most frequently on the face, especially on the bearded region, and on the hands, present some difficulties in treatment. First, they are auto-inoculable, and tend to spread very rapidly; second, they are multiform; and third, those on the face require some special care in order not to cause too much scarring with its resultant disfigurement.



A, transformer; *a*, socket and plug; *b*, current regulator. B, resonator and insulated needle holder; *g*, receiver for needle holder. C, electrode and needle attachment; *c*, platinum needle; *d*, grip; *e*, cork stay to fit snugly at *g*; *f*, pole.

After a careful and thorough trial, I offer the method for treatment here described, which has, in careful hands, these advantages: It is practically painless; only the most superficial scarring remains; there are no recurrences at the site of previous lesions; and it is very rapid in producing results.

The ordinary high frequency apparatus is used with the exception of the glass vacuum tube, instead of which, a metallic needle holder is used of such length that when it is inserted into the chamber of the high frequency apparatus an electric contact is formed. In the needle holder, a fine platinum or a very fine sewing machine needle is inserted and made secure.

One of the two methods may be employed after injecting a small amount of procain into the bases of the lesions: The needle may first be slipped into the base of the wart and the current turned on gently, then the current is gradually intensified until a small blister forms at the base of the wart: or the needle may be held and gently pressed at the apex of the lesion or brought within one-fourth to one-eighth of an inch of the lesion and sparked in either of the two last positions until moderate charring is observed at the apex, and the lesion becomes whitish. Experience alone is the best guide as to the strength of current, and the time of exposure in order to produce the least amount of scarring.

CONCLUSIONS

1. The method is practically painless.
2. It is safer than the roentgen ray.
3. It is bloodless.
4. There is less scarring than when curettage, followed by strong caustics, is employed.
5. No recurrences occur at the site of previous lesions.
6. Rapid results are produced.
7. It may be used with or without local anesthesia, but it is slightly uncomfortable without its use.

A STUDY OF A CASE OF YAWS (FRAMBESIA TROPICA) CONTRACTED BY AN AMERICAN SOLDIER IN FRANCE*

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PHILADELPHIA

Yaws, or frambesia, is essentially a tropical infectious and contagious disease caused by *Spirochaeta pertenuis* and characterized by a frambesiform granulomatous eruption.

Our knowledge of yaws is due to the following investigators: Charlouis,[1] who in 1881 proved by actual experiment that syphilis and yaws are two distinct maladies. This investigator inoculated thirty-two Chinese prisoners with crusts and scrapings from yaws lesions, and in twenty-eight instances succeeded in producing characteristic yaws. He also succeeded in inoculating a native suffering from yaws with syphilis, thereby definitely disproving the assumption that the two conditions were one and the same. It is a further matter of established fact that a syphilitic patient may contract yaws in the usual manner, as well as experimentally. For our clinical knowledge of yaws, we owe much to Numa Rat [2] and more recently to Castellani.[3] Rat's report, published in 1891, has become classic. The most important contribution to the history of the disease was the discovery of the causative agent (*Spirochaeta pertenius*) by Aldo Castellani [3] in 1905. The organism was cultivated in 1912 by Noguchi,[4] and important immunologic studies have since been made, notably by Neisser,[5] Nichols [6] and others.

Few, if any, genuine cases of yaws have been reported in which the disease was contracted in regions other than the countries in which it is endemic. However, cases of imported yaws occurring in nontropical

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* A contribution from the Dermatological Research Institute, Philadelphia.

* Read at the Forty-Third Annual Meeting of the American Dermatological Association, Asheville, N. C., April, 1920.

1. Vierteljahrschr. f. Dermatol. u. Syph. **8**: 1881.
2. Rat, N.: Framboesia (Yaws): Its Nature and Treatment, London, 1891.
3. Castellani: J. Ceylon Branch Brit. Med. Assn., **6**:17, 1905.
4. Noguchi: München. med. Wchnschr. **58**:1550, 1911.
5. Neisser, Baermann and Halberstädter: München. med. Wchnschr. **53**: 1337, 1906.
6. Nichols: J. Exper. Med. **12**:616, 1910; **14**:196, 1911.

countries have been reported in the literature. French writers (Breton, Rocheford and Labat) state that yaws occurred along the Mississippi river among the Indians, especially among the tribe of Caribs. Wood [7] reviews all the cases of yaws reported in the United States from the first authentic reference of the disease by Buckell, in 1737, to the year 1915. There were nine cases in all, including the case reported by Wood. Some of these were imported from tropical countries. In other cases the genuineness of the diagnosis may be questioned, particularly in view of the absence of laboratory evidence. In the case reported by White and Tyzzer [8] the disease was observed in a West Indian. This case was probably an imported one.

In the case reported by us the disease was contracted in France, probably through contact with an infected man stationed there during the war.

In a personal communication to us concerning this case, Castellani writes:

> From the description you give and the photographs, I would diagnose the case as one of yaws. I am not aware of the disease being previously recorded in France, but of course during the war a large number of native troops and workmen were imported into France from the tropical countries, and they may have imported the disease with them. As regards mode of infection, I am inclined to give more importance to direct contact than to insect carriers. Of course, in the tropics there is no doubt that in many cases the disease is carried by flies.

Dr. John A. Fordyce [9] has personally communicated to us information concerning an American sailor who contracted yaws while on duty at Brest, France.

Cassar [10] reports an observation on a patient with a tertiary case of yaws whom he had seen in France, September, 1918. This patient, an Annamite, was a soldier in the French army, who contracted yaws some years before in Ho-Keou. This is the only report of yaws occurring among soldiers recently mobilized in France that we have been able to find in the literature.

REPORT OF A CASE

The following is the history of an American soldier, in whom a clinical diagnosis of yaws was made. He contracted the disease while serving in France. He was admitted to the dermatologic service of Dr. Jay Frank Schamberg, at the Philadelphia General Hospital, Dec. 30, 1919.

7. Wood: Am. J. Trop. Dis. **2**:431, 1915.

8. White and Tyzzer: Jour. Cutan Dis. **29**:138, 1911.

9. Since this paper was written, C. S. Stephenson [Military Surgeon **47**: 344 (Sept.) 1920] reports a case of yaws occurring in an American sailor who was infected in Brest, France. This case, we believe, is the same one mentioned above in a personal communication from Dr. John A. Fordyce.

10. Cassar: Ann. de dermat. et syph. **7**:12, 1919.

The family history had no bearing on the condition. The patient was born in Philadelphia. He denied having had any infectious disease, gonorrhea or syphilis. His occupation prior to army service was that of a plumber's helper.

He joined the Royal Canadian Army, enlisting in Canada, during the early part of 1917, and was sent to England a few months later. He arrived at Folkstone and remained there for three weeks; he was then sent to France. At this time he was a member of the Royal Canadian Dragoons (cavalry), and he remained with this branch of the service until he was discharged in 1919. The members of this organization were composed of Americans and Canadians. He arrived in France about July, 1917, departing about August,

Fig. 1.—Circumscribed, infiltrated raised patches on scalp.

1919; most of this time, at intervals of fifteen months, was spent at Etappes in the northern part of France. This place was a large base for cavalry and infantry troops. Thousands of soldiers were gathered here: Canadians, Australians, New Zealanders, South Africans (white men), New Foundlanders and Chinese—labor battalion. He said that there were no soldiers from Algeria or India, indeed no other men than white, except negroes from Canada and Australia. About the longest time that he was away from Etappes was for three months, which were spent at Cambrai and its environment. On this occasion the cavalry followed in the wake of the tank attack on the German lines. For a time he was stationed at Valency and Mont-Gardens. The only time he saw dark skinned soldiers of the Allies was when he would meet them along the streets or in such places as saloons and Y. M. C. A. huts. At no time was he in close contact with them, such as sleeping in the same barracks.

He left France during the early part of August, 1919, from the port of Boulogne. Prior to this time he was stationed at the base at Etappes for some months. On the boat crossing the channel there were only Canadian troops. He arrived at Folkstone, England, and then went directly to Aldershot, England, to the Duke of Connaught Hospital. He was sent to the hospital from France on account of illness. The first symptoms noticed (while at Etappes) were rheumatoid pains in the knees and shoulders. At times these pains were sufficiently severe to incapacitate him. He had no other complaint. He traveled from France to the hospital in England as an ambulatory case. On arrival at the hospital he was confined to bed; later he had fever, 104 to 105 F., for three or four days. He was in the hospital one month, the pain gradually disappearing; he had no skin manifestation at this time. In the

Fig. 2.—Lesions on nose and hands.

same hospital and in the same ward were British troops recently returned from India, suffering from malaria. He also came in contact with a white man from Africa, who, in the patient's opinion, had similar lesions to those the patient had when he came under our observation.

He left the hospital about the middle of September, en route to Whitly, England, awaiting debarkation. He remained there for one week and was then sent to Liverpool; he sailed from that port and landed at Halifax in the early part of October. He was sent to Toronto for discharge on October 15. From Toronto he came directly to his home in Philadelphia. He was feeling well at that time. About a week after his return he first noticed small "pimples" on his palms which gradually became larger until they reached the size of the present lesions. One week later lesions appeared on the scalp and soles of his feet, although he felt well.

Physical Examination.—The general physical examination was negative except for a generalized adenopathy. The lymph nodes, with the exception of the epitrochlears, were about the size of almonds.

Dermatologic Examination.—The eruption was distributed on the palms, soles, scalp, forearms, throat and penis.

On the scalp there were five distinct areas of circumscribed, infiltrated raised patches, exhibiting a distinct elevated border and central depression and covered with a firm, bright yellow crust. The patches in the main were roundish, except where the lesions had coalesced. They were approximately of the size of a five-cent piece. On the left side of the scalp, in the parieto-occipital

Fig. 3.—Lesions on palms of hands.

region, was a coalescent patch 8 by 4 cm. One of the patches was of crescentric shape with a raised border and a cicatricial base and center, where ulceration had previously been present (Fig. 1).

The lesions in general had a verrucoid and papillomatous surface and bore a general resemblance to the lesions of blastomycosis. For the greater part, the patches appeared to be devoid of hair. On the center of the dorsum of the nose, there was a conical, rounded lesion about 1 cm. in diameter, projecting about 5 mm. above the level of the skin and covered with a yellow and brown crust. The other lesions were situated as follows: a lesion the size of a five-cent piece on the posterior aspect of the arm, near the elbow; one, half that size on the flexor surface of the arm nearby (Fig. 2); one large lesion on the palm of each hand (Fig. 3); one lesion 1.5 cm. in diameter on the flexor aspect of the third phalanx of the ring finger of the left hand; three well developed lesions on the plantar surface of the right foot. There

was one lesion on the interdigital space (between the great and first toe). A lesion, the size of a quarter, was on the outer aspect of the right foot below the malleolus (Fig. 4). There were two large lesions, oval in shape and varying in a general way in size from that of one cent to that of a five-cent piece, on the inner side of the left leg, just above the malleolus. Another lesion the size of a five-cent piece was situated in the popliteal space. Nearly all of the latter lesions were elevated 5 mm. or so above the skin and had a distinct fungoid or papillomatous appearance. Many were covered with a crust, which on being detached, through violence, exposed an irregular, reddish, ulcerated surface. The palmar and plantar lesions projected well above the skin level, and showed an irregular, wartlike surface, covered with reddish and yellowish crusts. On the left forefinger, and scattered elsewhere on the palmar aspects of the fingers, were pinhead sized and large sized conical, papular reddish spots, with central horny plugs. As the central plugs fell out they left a depressed central pit.[11]

On the prepuce were numerous wartlike excrescences which bore a rough resemblance to condylomata acuminata.

On the columna of the nose and on the left nostril were two, lentil-sized to pea-sized, obtuse, dull red elevations.

Stretching across the entire soft palate was a band, about 2 cm. in diameter, of a filmy whitish discoloration on a slightly inflammatory base. It had an appearance intermediate in character between a huge mucous patch and a leukoplakia. There was also a whitish noninflammatory patch on the right buccal membrane.

Dark Field Examination.—The serum obtained from the surface of some of the skin lesions showed spirochetes having the morphologic characteristics of *Spirochaeta pallida.* The secretion obtained from the throat lesion was negative.

Wassermann Reaction.—The Wassermann reaction was + + + + with cholesterolized, alcoholic, syphilitic liver and acetone, insoluble lipoid antigens.

Blood culture was negative. Intratesticular injection into rabbits was made with an emulsion from one of the skin lesions. The results are given under the head "Experimental Studies."

Histopathology.—The microscopic changes in the skin in yaws have been carefully studied by Unna, MacLeod, Jeanselme, Plehn, and in more recent years, by Schüffner, Marshall, Shennan, Siebert, Ashburn, Craig, Löhe, and White.

Briefly stated, the changes found are: a marked thickening in the epidermis with elongation of the rete pegs; swelling, vacuolation and degeneration of the epithelial cells; not infrequently sharply circumscribed areas in the epidermis containing polymorphonuclear leukocytes and detritus (these in reality represent miliary abscesses, in which spirochetes are not infrequently found); marked edema of the corium and the presence of a diffuse cellular infiltration made of polymorphonuclear leukocytes, large and small mononuclear leukocytes, eosinophils, plasma and mast cells and connective tissue cells. In nodules that have existed for some time plasma cells are seen in large numbers.

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11. These lesions bear some resemblance to "follicles." Castellani described lesions of a similar nature and referred to them as a "peculiar frambeside of the palms"; Castellani and Chalmers: Mannual of Tropical Diseases, Ed. 3, p. 1550.

MacLeod has called attention to the fact that there is no perivascular cell infiltration nor endothelial proliferation, and that this contrast is of great importance in the differentiation from syphilis. In yaws, there are more changes in the epidermis and less in the corium than in syphilis. Furthermore, greater edema in the corium is encountered, and giant cells are as a rule absent.

In our own case, a nodule was removed from the right forearm and stained for histologic study; it was also stained with the Levaditi stain for spirochetes.

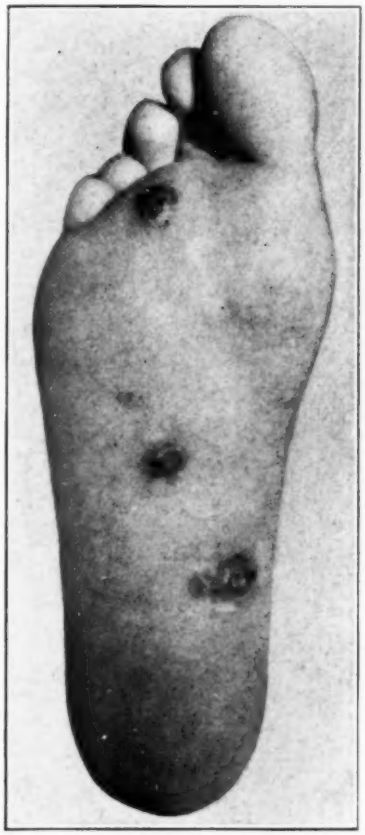

Fig. 4.—Lesions on right foot.

A well pronounced necrotic crust (Fig. 5) was seen covering a part of the epidermal surface. There was enormous hyperplasma of the epiderm, with great thickening and elongation of the papillary rete projections (Figs. 6 and 7). Parts of the epidermis appeared to be changed, but elsewhere the intercellular spaces were infiltrated with polymorphonuclear leukocytes. In one area a distinct miliary abscess was seen on a level with the summits of the papillae; in this abscess seven or eight spirochetes were seen in the Levaditi stained sections (Fig. 8).

Some of the epithelial cells exhibited a degenerative change. Throughout the corium edema was present, and a rich polymorphonuclear leukocyte infil-

tration was seen. Lymphocytes and plasma cells were present in moderate numbers.

The blood vessels exhibited no perivascular change, an observation corroborated by Prof. Allen J. Smith of the University of Pennsylvania and Prof. Randle C. Rosenberger of the Jefferson Medical College.

Treatment. — Neo-arsphenamin, 0.9 gm., was administered intravenously, resulting in the disappearance of many of the lesions and marked improvement in others in a fortnight. Fourteen days later a second injection of the same dose was given, which caused a complete resolution of the remaining lesions (Fig. 9). The Wassermann reaction at this time, performed with the three stated antigens, was ++++. Frequent Wassermann tests were performed, and the reaction remained ++++ until the end of February, 1920, at which time the reaction was +++ with the syphilitic liver antigen, but remained at ++++ with the other two antigens. The table is a chronologic record of treatment and of the Wassermann reactions.

WASSERMANN REACTION

Date	Antigens		
	Cholesterolized	Alcoholic Syphilitic Liver	Acetone Insoluble Lipoids
Jan. 2, 1920	++++	++++	++++
Jan. 9, 1920	++++	++++	++++
Jan. 16, 1920	++++	++++	++++
Jan. 22, 1920*	++++	++++	++++
Feb. 1, 1920	++++	++++	++++
Feb. 5, 1920*	Test not performed		
Feb. 13, 1920	++++	++++	++++
Feb. 22, 1920	++++	++++	++++
Feb. 26, 1920	++++	+++	++++
March 4, 1920	+++	++	+++
March 19, 1920	+++	++	++
April 2, 1920	+++	++	++
April 9, 1920	+++	++	++
April 14, 1920*	Test not performed		
April 19, 1920	+++	++	++
July 8, 1920	+	Neu.	Neu.

*0.9 gm. neo-arsphenamin given intravenously.

A third intravenous injection of 0.9 gm. of neo-arsphenamin was given in April, 1920. No further Wassermann tests were made until July, 1920, at which time the tests showed a + reaction with the cholesterolized antigen and a negative reaction with the alcoholic liver and acetone insoluble lipoid antigens. The patient has remained subjectively well and has been free of any clinical occurrence.

PARASITOLOGY

Yaws, like syphilis, is a spirochetal disease. To the student of syphilis it is of particular interest since it is in many ways similar to this disease clinically and biologically. So closely clinically do the two diseases simulate each other that differential diagnosis is often difficult; indeed for a long time it was maintained by many that yaws was a tropical form of syphilis. No less an authority than Jonathan

Hutchinson concurred in this opinion. As we shall point out, the laboratory differentiation of the two diseases is likewise difficult. A knowledge of yaws is perhaps of aid to a better understanding of the immunologic problems of spirochetal diseases. A summarization of our knowledge of the differences in immunity tests, experimental lesions and in serum reactions between the two organisms is of interest.

Fig. 5.—Section of yaw stained with hematoxylin and eosin; necrotic crust overlies a part of the epidermal surface of the lesion with dense infiltration with polymorphonuclear leukocytes; ×70.

Spirochaeta pertenuis is an extremely delicate spiral-shaped organism, varying in length from a few microns to 18 to 20 microns and even more. The organism belongs to the genus Spirochaeta (Schaudinn, 1905), the type organism of which is the *Spirochaeta pallida* (Schaudinn and Hoffman, 1905). The measurements of this genus, according to Noguchi are:

Length: 16 to 14 microns; pointed ends. Diameter: 0.25 to 0.3 microns, cylindrical. Spiral amplitude: 1 micron; regular, rigid; spiral depth: 0.8 to 1 micron; very constant. Waves: one or more slight undulating curves may be present. Axial filament: doubtful. The whole seems to consist of a spirally wound axial filament. Chambered structure: absent. Membrane: doubtful; if

there is one it must be flexible. Crista: absent. Terminal finely spiral filament: present; easily seen in cultures. Flagella: absent; highly motile end portion: absent. Division: transverse or possibly also longitudinal. Habitat of genus: two pathogenic and several harmless parasites. Other species: pertenue, microdentium, macrodentium, mucosum, calligyrum, minutum. Staining properties of axial filament and cell membrane: membrane not recognizable.

Schaudinn and Castellani considered *Spirochaeta pallida* and *Spirochaeta pertenuis* practically morphologically identical, although Blanchard, Morton, Prowazek, Russell and others have pointed out some slight morphologic differences. This morphologic similarity exists among the entire species of the genus Spirochaeta, but notably among *Spirochaeta pallida, S. pertenuis* mucosum and microdentium. It is the concensus of opinion that the two organisms are morphologically indistinguishable. In this regard Castellani [12] states: "We believe that the differentiation of the two organisms . . . is to be based more on the biological results than on slight morphological differences."

We have observed *Spirochaeta pertenuis* in the dark field microscope with one portion of the organism straight and the remaining portion with the characteristic coils preserved. This has been observed only when the organism was in contact with obstacles. Castellani has also observed this phenomenon. The above morphologic changes can be contrasted with a similar change occurring in two organisms, *Leptospira icterohaemorrhagicae* (Inada and Ido) and *Leptospira icteroides* (Noguchi). The former is the causative agent of infectious jaundice and the latter of yellow fever. This change, as described by Noguchi, is as follows: *Leptospira icterohaemorrhagicae,* in the dark field picture in free space, is seen as a rapidly motile organism with a number of fine spirals with one or both ends semicircularly hooked. When motion ceases, many of them lose the typical hooks; when penetrating semifluid mediums, the organisms become serpentined, waved, and assume large wavy undulations, and the typical hooked ends disappear. When penetrating semisolid mediums, the organism again assumes a change in morphology. The change in the morphology of *Leptospira icterioide,* as given by Noguchi,[13] is somewhat similar to *Leptospira icterohaemorrhagica.*

As we shall later point out, the morphologic deviation is more apparent in stained specimens of the organism. We have never observed a similar change in the morphology of the *Spirochaeta pallida* either in dark field or in stained specimens from human lesions.[14] In speci-

12. Castellani: J. Trop. Med. **9**:3, 1916.

13. Noguchi: J. Exper. Med. **30**:1, 1919.

14. However, we find a reference by Noguchi in his Harvey lecture on "Spirochaetes," in which he states that organisms obtained from syphilomas of rabbits' testicles, immediately fixed and stained, exhibit striking irregularity of curves unlike the accustomed picture.

mens from human sources, the coils remain constant. Schaudinn states that under unusual conditions the coils are obliterated, and straight and artificial forms are seen. It is well known, and has been observed by us, that culture specimens of pallidum exhibit morphologic variations. Under such circumstances, irregular forms may be seen, the organism tending to become short and plump.

Staining Properties of Spirochaeta Pertenuis.—It is generally stated by writers that *Spirochaeta pertenuis* stains with difficulty. This has been our experience, and there is no doubt that this organism is more

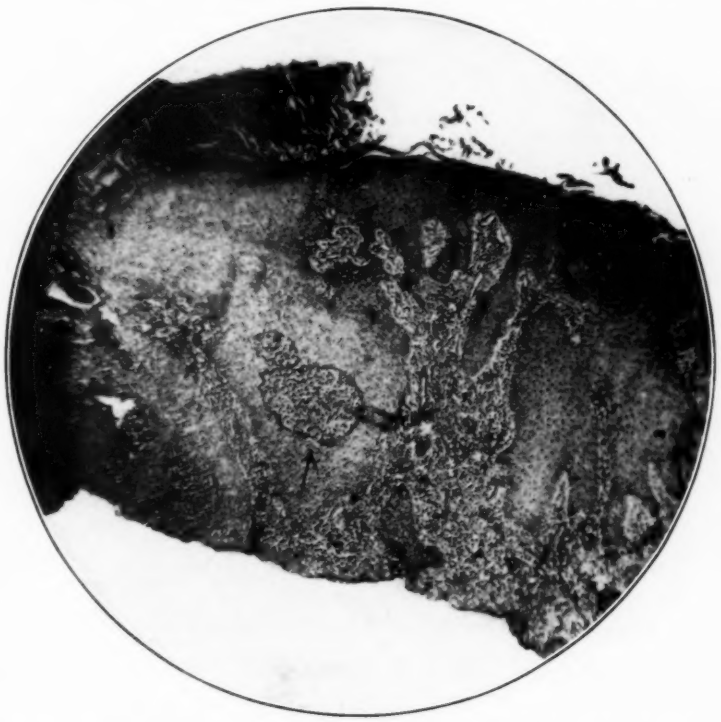

Fig. 6.—Section of yaw stained with hematoxylin and eosin showing epidermal changes. The arrow points to a circumscribed collection of polymorphonuclear leukocytes in the epidermis; × 70.

difficult to stain than *Spirochaeta pallida.*[15] For staining the organism Castellani recommends Leishman's stain, the alcoholic solution to act for five minutes, and the subsequent admixture with distilled water

15. Indeed, in our opinion, the lesser affinity of *S. pertenuis* for the usual spirochetal stains is so striking as to constitute a point of important differential value. We have never had much difficulty in staining the *S. pallida,* but we have experienced the greatest difficulty in obtaining satisfactory stained specimens from our case of yaws, although scores of slides were stained.

for from one half hour to several hours. Other writers recommend one of the Romanowsky stains (Giemsa, Wright, Leishman), pointing out that it is necessary to have the stain act for from a few hours to many hours. With these stains we were unable to obtain satisfactory results; the organism was either faintly stained or not stained at all. With the Fontana stain we succeeded in staining what we considered to be the organism but with curves entirely obliterated. We obtained the best results with the anilin black stain of Rosenberger and Fanz. With this stain many of the organisms were well stained, but the organism did not appear so regularly curled as is shown in the dark field picture. Again, and this point we wish to emphasize, some appeared with one portion entirely straight and the remaining portion either with the curves intact or the curves were much more irregular and coarse (Figs. 10 and 11). Thus it was apparent to us that the stained organism presented a changed morphology. The curves in stained specimens of *Spirochaeta pallida* are perhaps less regular than in the dark field picture, but this change is considerably less apparent than with *Spirochaeta pertenuis* (Fig. 12). The truth of this becomes apparent when one contrasts published photomicrographic pictures of the pallidum and pertenue. In this regard we may quote Bosanquet's [16] statement: "In the illustrations given by Castellani, *Spirochaeta pertenuis* does not appear so regularly curled as is *Spirochaeta pallida*." In Ashburn and Craig's [17] study of the *Spirochaeta pertenuis* they observed many variations in the shape of the stained organism, which they describe by dividing them into seventeen different types or classes. In the diagrammatic illustration of the types of stained specimens, these morphologic changes are well shown. They attributed the changed morphology to physical forces acting on the organism during the making and drying of stained specimens. They contrasted this change with similar changes that a spiral wire spring could be made to present when subjected to analogous forces when one or more of its coils are straightened out by traction and pressure. This explanation is doubtless correct; however, since all spiral organisms when stained do not present such marked morphologic changes, it must be regarded as a characteristic of *Spirochaeta pertenuis* and is valuable in the differentiation of stained specimens of *S. pallida* and *S. pertenuis*.

Leptospira icterohaemorrhagicae and *Leptospira icteroides* when stained may appear different than in the dark field. Noguchi [18] has shown that the natural features of these organisms can be well pre-

16. Bosanquet: Spirochetes, Philadelphia, W. B. Saunders Company, 1911.
17. Ashburn and Craig: Philippine J. Sc. **2**:441, 1907.
18. Noguchi: J. Exper. Med. **25**:755, 1917; **27**:575, 1918; **30**:1, 1919.

served when they are fixed in osmic acid vapor and then stained over night with Giemsa's solution. Noguchi states that specimens of *Leptospira icteroides* fixed with methyl alcohol seldom retain the elementary spirals, and that the beauty of the organism as it appears by dark field illumination is never well retained in a stained preparation, even in the best specimens. In the latter, it appears almost as a totally different organism. This is apparently true also of *S. pertenuis*. For staining this organism Schüffner [19] states that most satis-

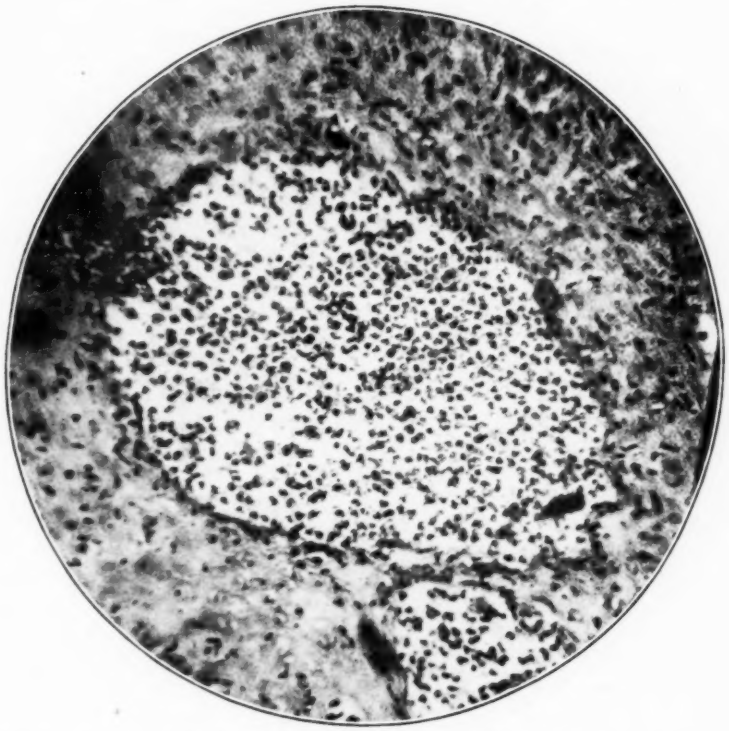

Fig. 7.—Circumscribed islet of polymorphonuclear leukocytes in the epidermis indicated by the arrow in Figure 6; × 288.

factory results are obtained by Romanowsky stain when preceded by osmic acid or formaldehyd vapor fixation. Further endeavors to obtain better stained specimens of *S. pertenuis* are being made by us.

Distribution of Spirochaeta Pertenuis in Tissues.—The organism is constantly found in the primary and secondary lesions, but rarely in the tertiary lesions. In men, they have been demonstrated in the splenic blood and in the blood of the general circulation and in the bone marrow of inoculated animals. They have never been found in

19. Schüffner: München. med. Wchnschr. **44**:1364, 1907.

the cerebrospinal fluid, nor has their presence been demonstrated in this fluid by animal inoculation. This observation is consistent with our clinical knowledge concerning the absence of neurol involvement.

Although there is a generalization of the parasite in yaws, pathologic visceral changes have not been demonstrated in man, and tertiary manifestations are relatively rare.

EXPERIMENTAL LESIONS IN THE RABBIT AND MONKEY

The susceptibility of the rabbit's testicle to syphilitic infection is duplicated with *Spirochaeta pertenuis*. Indeed, this susceptibility is successful in a greater percentage of cases than with *S. pallida*.

The species of animal used and the source of the virus and its concentration are factors that influence the percentage of positive inoculations with each organism.

Up to the present writing, six months since the initial inoculation of rabbits' testicles with a yaws lesion from the case herein reported, we have carried this strain of *S. pertenuis* through four transfers in rabbits.[20]

Technic of Testicular Inoculation.—A yaws nodule removed from the patient's forearm was placed in a sterile mortar and finely minced with scissors. Sufficient sterile salt solution (0.85 per cent.) was added to make an emulsion containing from one to three spirochetes to the microscopic field. The fluid emulsion was aspirated into a small glass syringe fitted with a 20 gage needle, about three-quarters inch in length. The scrotum of the animal to be inoculated was painted with dilute tincture of iodin, and 0.5 c.c. to 1 c.c., depending on the size of the testicle, was injected into the center of each organ.

Rabbit transfers were made by removing aseptically an infected testicle. An infected node was removed and made into an emulsion as above described. Other rabbits were inoculated with this emulsion, the strength of which was approximately the same for each transfer.

Technic of Scrotal Inoculation.—The scrotum of the animal to be inoculated was painted with dilute tincture of iodin. A 16 gage needle was inserted just beneath the skin of the scrotum. A portion of a node from an infected rabbit's testicle was inserted through this needle by means of a wide trocar. In some animals the infected tissue was placed in the tunica vaginalis.

Technic of Inoculation of Anterior Chamber of the Eye.—The eye of the animal to be inoculated was cocainized with a 2 per cent. solution, an eye speculum was inserted and the eye fixed with a forceps. The anterior chamber was punctured with a 23 gage platinum needle inserted at the sclerocorneal junction. This procedure resulted in the evacuation of aqueous fluid and the collapse of the anterior chamber. To the needle was fitted a Fournier syringe, and three or four minims of an infected emulsion was injected.

Technic of Intravenous Injection.—Five c.c. of blood were withdrawn by venipuncture from the yaws patient. At the time of this withdrawal the

20. The organism is still under observation in rabbits and further studies are being conducted.

patient had not been treated and was in the acute stage of yaws. To this blood were added 5 c.c. of a 1 per cent. solution of sodium citrate in normal salt. This mixture was injected into the vein of the ear of each rabbit.

Technic of Inoculation of a Monkey.—On the eyebrow of a monkey a scarification was made, and on this area was rubbed a portion of a yaws lesion removed from the patient. A dark field examination of this yaws lesion disclosed many actively motile spirochetes. Another and similar attempt to inoculate a monkey's eyebrow was made with a node removed from an infected rabbit's testicle. In addition, an emulsion made from this node was injected subcutaneously in the region of the eyebrow.

Fig. 8.—Islet of polymorphonuclear leukocytes in the epidermis indicated by the arrow in Figure 6. This section was stained by the Levaditi method to show *S. pertenuis;* × 700.

Testicular Lesions in the Rabbit.—We succeeded only in obtaining one variety of yaws lesion in the rabbit, namely, testicular. We failed to produce corneal and scrotal lesions and to infect the rabbit intravenously by the injection of the blood of the yaws patient while in the acute stage of the disease.

In the first series of rabbit inoculations, there were 50 per cent. positive results with an incubation period of about thirty-four days. In this series some died before the expiration of thirty-four days, and one was killed because of the development of a contagious infection. In the second transfer 75 per cent. gave a positive result with an incubation period of about thirty-nine days. In the fourth transfer 37 per cent. gave a positive result with an incubation period of about sixty-five days.[21] In Nichols'[22] series, the incubation period with inoculation of fluid of lesions of the testicles, caused by *Spirochaeta pertenuis*, was forty-five days for the animal in the first transfer; for the last animals in the ninth to the fourth transfers it was twenty-nine days. With tissue inoculation the period averaged from twenty-three to twenty-five days. For the entire series of fifty-two animals, the incubation period was twenty-six days, or eight days shorter than the period required by his series of rabbits inoculated with *Spirochaeta pallida*.

There are essentially no differences in the experimental testicular lesions of syphilis and of yaws. From our examination of a testicle infected with yaws, this is apparently the case histologically. This examination disclosed similar changes to those resulting from syphilitic infection.

In the majority of our positive rabbits the inoculation first became apparent in an enlargement of the scrotum. This enlargement consisted of edema, and on puncturing the tunica vaginalis a gelatinous fluid was obtained, which contained *Spirochaeta pertenuis*. The appearance of edema usually forecast the development of one or several nodes, either in the epididymis, in the testicle or in both organs. The nodes (lesions), at first just appreciable to touch, developed to about the size of a pea. We did not observe lesions much larger than a pea; occasionally they did not progress to the size of a pea and these lesions rapidly disappeared. On puncturing the lesions numerous spirochetes were found. The organism was almost twice the length of the same organism studied from the original yaws lesion in the patient, and they were further characterized by the change of morphology already described. After removing the infected testicle, grossly the lesion was sharply marginated and cartilaginous in consistency. Figure 13 is a photograph of the positive rabbits. The scrotum is enlarged and edematous. In each testicle a node was palpable.

In the infected lesions, numerous and freely motile *Spirochaetae pertenues* could be demonstrated for only a short period, about ten days. After this period the organisms would suddenly disappear in

21. About ten rabbits were used in each transfer.

22. Nichols: J. Exper. Med. **14**:199, 1911.

the aspirated fluid. However, after a variable period they were again present in large numbers. In the interval between their disappearance and reappearance the gross appearance of the infected organ would remain unchanged and the infected nodules were palpably the same; no organism, either motile or nonmotile, could be demonstrated on puncture. At the time of reappearance of the organisms, the infected testicle was edematous. Our transfers were always made at the time the punctures showed numerous and freely motile organisms. How-

Fig. 9.—Disappearance of lesions after treatment.

ever, we made one transfer, during the time the organisms could not be demonstrated, by puncturing an infected node. The dark field examination of this infected node after removal was negative, yet, curiously the transfer made from this node gave a positive result with an incubation period of eighteen days. Further studies are being made concerning the infectivity of *S. pertenuis* in the different stages of experimental lesions.

Somewhat similar phenomena have been observed in experimental lesions in syphilis by Brown and Pearce,[23] who have described them in their excellent and comprehensive studies of experimental syphilis

23. Brown and Pearce: J. Exper. Med. **31**:4, 1920.

in the rabbit. We may divert here and dwell on this phenomenon, since it is of interest in the clinical visualization of syphilis and indeed of all spirochetal diseases. The course of syphilis and yaws in the rabbit is somewhat a replica of these diseases as observed clinically. Syphilis and yaws in the rabbit may be mild, transitory and spontaneously cured; again, the lesions may become quiescent or latent, and later active; in this way a cycle is developed. As stated by Brown and Pearce, the duration of this local infection, as in experimental syphilis determined by the presence of active lesions, was as variable as the course of the infection itself, and no fixed limits can be given, either for the several phases of the local reaction or for the infection as a whole. The period of active infection varies from one to more than twelve months. In some animals the entire process was represented by one intense cycle of acute reaction, which terminated within from four to six weeks after inoculation; in others, the infection continued through successive cycles of reaction, but the period of active infection was rarely longer than from two to four months. Brown and Pearce have also shown that *Spirochaeta pallida*, just before the height or relapse of the acute cycle, began to increase in number. This increase continued parallel with the development of the lesions, so that by the time the lesions had reacted to the acme of the first cycle of their development, actively motile organisms were present in large numbers. At this point the organisms suddenly began to lose their motility and to collect in tangled masses; following this phenomenon, they rapidly diminished in number so that within a few days organisms were difficult to find in fluid aspirated from the testicles, and those seen were either degenerated or showed slight motility; in many instances no organisms could be found. After passing through a crisis such as this, actively motile spirochetes again appeared in the testicular fluid and increased in numbers, thus pre-aging a renewed activity on the part of the lesions. These parallel changes continued throughout the existence of the local infection.

As noted, we have observed in a general way a similar cycle with *Spirochaeta pertenuis*, although our observations have not been sufficiently extensive to formulate an exact comparison. Brown and Pearce attribute the phenomena referred to above to a cyclic immunologic reaction. They have further shown that the infecting power of the organism at this stage is markedly diminished. In one of their experiments, a series of animals inoculated with approximately ten times the dose of immobilized and agglomerated organisms that was used in the controls, showed an incubation period of six weeks as contrasted with three weeks in the controls, while the lesions were as slow to develop and were less pronounced than in control animals.

Similar observations as to the inactivity of *S. pallida* at different periods of the infection were made, and there is no doubt in the minds of these workers as to the significance of the cyclic reactions they describe.

SCROTAL LESIONS IN THE RABBIT

As stated, we failed to produce lesions of the scrotum. Nichols,[22] however, succeeded in producing such lesions. He inoculated seven animals under the skin of the scrotum with testicular tissue. In six days two animals had developed hard nodules which enlarged to typical chancres; the other five failed to show lesions. He observed eight chancres after inoculation of the testicle in other animals. The incubation period of these chancres averaged twenty-three to twenty-five days, a period less than half that in syphilis in Nichols' experience. He points out that in contrast with the difference seen in yaws and syphilitic lesions of the monkey's eyebrows, there is practically no difference in the lesions which are produced in the rabbit's scrotum by *S. pallida* and *S. pertenuis,* except as regards the incubation period.

INTRAVENOUS INOCULATION OF RABBITS

As already mentioned, we failed to inoculate rabbits by the intravenous injection of the patient's blood with yaws. Castellani[24] produced a generalized infection in rabbits by intravenous inoculation. He says that the character of the lesions produced, which occur mostly about the head, are distinctive of yaws to such an extent that this method may be used in differentiating *S. pertenuis* from *S. pallida.*

EXPERIMENTAL LESIONS IN MONKEYS

Neisser, Baermann[5] and Halberstädter[25] and others—Prowazek, Castellani, Nichols, Levaditi, Ashburn and Craig—have shown that monkeys are susceptible to experimental infection with yaws. The character of the lesions resulting at the site of inoculation, usually the eyebrows, is distinctive; at first it is an infiltrated area which slowly increases in size; there is free secretion of serum that forms into a thick crust, which on removal exposes a granulating red surface. This lesion closely resembles the fungating yaws lesion seen in man.

In the low class of monkeys of the genus Macacus and the genus Semopithecus, the eruption is confined to the site of inoculation, although *Spirochaeta pertenuis* has been demonstrated by Castellani[26]

24. Castellani: Biochim. e terap. sper. **8**:337, 1912.
25. Halberstädter: Arb. a. d. k. Gesndhts amte **26**:48, 1907.
26. Castellani: J. Hygiene **7**:558, 1907.

in the spleen and lymphatic glands, thus giving evidence of a generalization of the infection. However, Halberstädter succeeded in obtaining a general eruption in ourang-outangs.

We made several unsuccessful attempts to inoculate the eyebrow of a Semopithecus monkey. Nichols [27] gives the following differen-

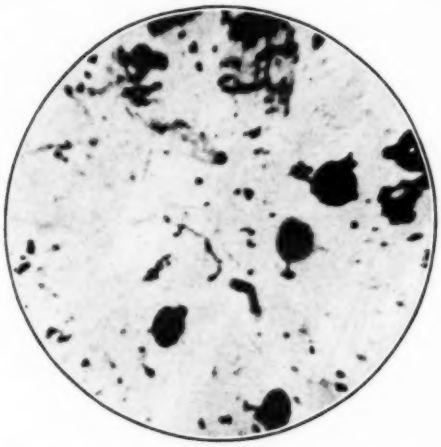

Fig. 10.—*S. pertenuis* stained with anilin black (Rosenberger and Fanz).

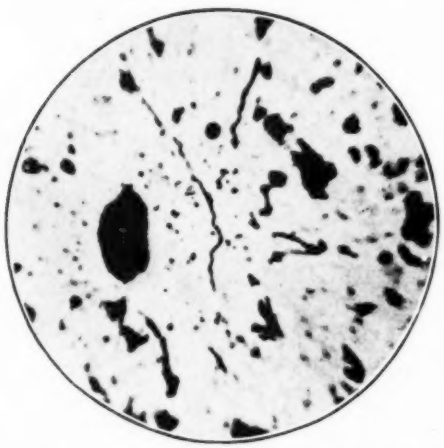

Fig. 11.—*S. pertenuis* stained with anilin black. Note the irregular curves.

tiation between the experimental lesion of yaws and syphilis in the monkey: In yaws the incubation period is from two to three weeks; the lesion is elevated, slightly scaly and edematous. In syphilis the incubation period is about four weeks; the lesion is flat, dry and scaly.

27. Nichols: J. Exper. Med. **12**:621, 1910.

LABORATORY DIFFERENTIATION OF YAWS AND SYPHILIS

Neisser, Baermann and Halberstädter have shown that monkeys infected with yaws do not become immune to syphilis, and vice versa, monkeys infected with syphilis do not become immune to yaws. This experiment furnished further proof that yaws and syphilis are different diseases. In addition, it furnished a definite laboratory method of differentiating the two organisms. It becomes apparent from data herein presented that a laboratory diagnosis of yaws and syphilis is difficult. The diagnosis cannot be made by the Wassermann reaction or the dark field microscope. The rabbit's testicle is not suitable for the resistance experiment of Neisser, Baermann and Halberstädter for the following reasons: We have frequently observed, and it has also been observed by others, that there is a migration of

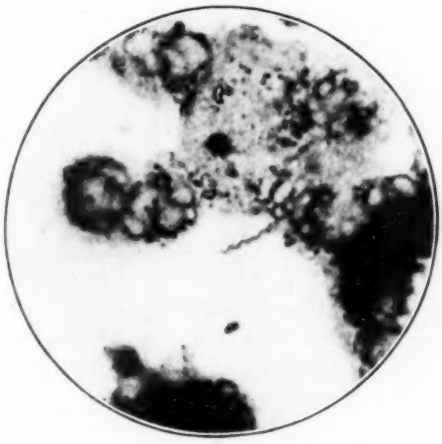

Fig. 12.—*S. pallida* stained with gentian violet.

spirochetes from an inoculated testicle to the noninoculated testicle. In addition, inoculation with *Spirochaeta pallida* or *S. pertenuis* does not give a positive result in 100 per cent. of cases. However, Nichols [28] succeeded in differentiating the two organisms by testicular inoculation and cross infections with syphilis and yaws after treatment with arsphenamin. He observed that rabbits infected with *Spirochaeta pertenuis* were permanently cured by a dose of 0.0045 gm. of arsphenamin per kilo, while animals infected with *S. pallida* and treated with a similar dose usually had a relapse; a smaller dose than 0.0045 gm. per kilo, however, failed to kill *S. pertenuis*.

Nichols treated syphilitic rabbits with 0.01 gm. of arsphenamin per kilo; fifteen days later he inoculated them with yaws. All the

28. Nichols: J. Exper. Med. **14**:209, 1911.

animals became infected with yaws, although the testicular lesions were smaller than normal and the incubation period longer. Other syphilitic animals were similarly treated and reinoculated with syphilis, thirteen to sixteen days after treatment. None of the animals became infected with syphilis. Hence, Nichols concludes that in rabbits, as well as in monkeys, a difference between the two diseases can be demonstrated by inoculation and curative experiments.

Although our observations regarding arsphenamin and neo-arsphenamin therapy in experimental yaws are not yet completed, we failed to cure rabbits infected with *S. pertenuis* with 0.005 gm. of arsphenamin per kilo, a slightly greater dose than that which, in Nichols' experience, cured permanently. Contrasted with the dose of arsphenamin, we observed the curative dose of neo-arsphenamin to be 0.008 gm. per kilo.

The most reliable and convincing method of differentiating between yaws and syphilis, by laboratory experiments, is the production of a chancre on one eyebrow of a monkey and the subsequent production of a frambeside on the other eyebrow or vice versa.

THE WASSERMANN REACTION IN HUMAN AND EXPERIMENTAL YAWS

Judging from the occasional reports in literature in which the Wassermann reaction in yaws was negative, it is evident that the test is not invariably positive. In Baermann and Wetter's [29] series of 125 cases of yaws studied in Java, the Wassermann reaction was positive in thirty-five of thirty-eight acute untreated cases. In ten treated cases the reaction was positive in six. In fourteen cases of latent yaws, in which the infection was of many years' duration and a long time had elapsed without symptoms or treatment, the reaction was positive in five.

According to Schüffner and Violle, the complement fixation reaction is frequently positive if an alcoholic extract of syphilitic liver is used as an antigen, while there is no fixation if an aqueous extract is used. It may be recalled that the original Wassermann technic provided for the use of an aqueous extract of syphilitic liver. When one contrasts the relative merits of these two antigens when used in the Wassermann reaction in syphilis, it becomes consistent with the experiment of Schüffner and Violle that an antigen of an alcoholic extract of syphilitic liver should give a greater percentage of fixation in yaws than an antigen of an aqueous extract of syphilitic liver.

The Wassermann reaction [30] of the serum of the patient with yaws was performed with the following three antigens: a 4 per cent. cholesterolized beef heart, alcoholic syphilitic liver and acetone insoluble

29. Baermann and Wetter: München. med. Wchnschr. **57**:2131, 1910.

30. The Wassermann tests were kindly performed for us by Prof. John A. Kolmer.

lipoids. In the acute untreated stage the reaction was ++++ with all antigens; however, after treatment the reaction with the cholesterolized antigen inhibited hemolysis to a greater degree; in other words, was stronger than the reaction performed with the remaining two antigens. The last reaction we observed was ++ with the cholesterolized beef heart antigen and negative with the other two antigens. It is interesting to note that the relative sensitiveness of these three antigens when used in the Wassermann reaction in yaws is the same as in our experience with syphilis.

The complement fixation test of the yaws serum was also performed with a salt solution extract of a testicular nodule from a rabbit infected with yaws.[31] This extract contained about three *S. pertenuis* organisms to a microscopic field. The reaction with the

Fig. 13.—Rabbit's testicles successfully inoculated with *S. pertenuis* from cutaneous lesions in the case reported. The organs are enlarged and edematous; a palpable node is present in each organ. A dark field examination of the serum obtained on puncturing each node disclosed many spirochetes.

yaws serum yielded a slight, but definite, degree of fixation, whereas the reaction of the pooled serums of three syphilitic patients yielded separately a ++++ reaction with a cholesterolized, alcholic, syphilitic liver and acetone insoluble lipoid antigens. From this observation it would appear that the Wassermann producing substance in yaws, as in syphilis, has a dual origin; on the one hand, it is a specific biologic substance caused by *S. pertenuis* and *S. pallida,* respectively,

31. It should be noted that salt solution was used in making this extract. Specific culture antigens employed in the complement fixation tests have been made by some investigators using alcohol as an extracting agent, but Dr. Kolmer believes that a salt solution extract gives better results.

and on the other hand, a nonspecific substance arising less directly from these organisms.

The complement fixation reaction obtained in human yaws serum stated above, using a specific yaws antigen, is in accordance with similar results obtained by Castellani [32] and by Bowmann; [33] on the other hand, Baermann and Wetter [34] failed to obtain fixation in the serum of human yaws using a specific yaws antigen. Nichols [35] failed to obtain fixation with the serum of animals infected with yaws with a specific yaws antigen. He applied complement fixation tests to the serums of rabbits infected with *S. pallida* and *S. pertenuis*, in which he used culture antigens of these two organisms, as well as culture antigens of *Spirochaeta dentium* and a syphilitic liver antigen. He showed that rabbits infected with *S. pallida* and with *S. pertenuis* gave a ++ reaction with the syphilitic liver antigen, but no reaction with specific culture antigens either at the height of the lesions or after recovery.

The nature of the substance producing a positive Wassermann reaction in yaws is not definitely known; indeed, the underlying principle of this reaction in syphilis is not definitely known. We do know, however, that the Wassermann producing substance is of lipotropic nature, and that the character of the reaction is probably colloidal. That this substance is apparently not a specific biologic product of spirochetes is evidenced by the fact that the same, or at least a similar substance, is present at times in leprosy.

It will be recalled that weak complement fixation occurs with a small percentage of serums in human syphilis employing a specific antigen, that is, a culture of *S. pallida* or aqueous extracts of infected testicles. This observation, as already mentioned, points to a dual origin of the Wassermann producing substance in syphilis. However, this antigen is considerably less sensitive than the nonalcoholic extracts of syphilitic and nonsyphilitic tissue now in common use and therefore of no practical value in the conduct of the Wassermann test. Indeed, the more frequent and greater fixation obtained with nonspecific antigens is proof that the Wassermann test is not a specific antibody complement reaction. The complement fixation test with specific antigens, that is, aqueous (not alcoholic) extracts of pure cultures has not a sufficiently definite status to be of great value in the differentiation of yaws and syphilis; although our observations in this regard were positive, the observations of others were variable.

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32. Castellani: J. Hygiene **7**:558, 1907.
33. Bowmann: Philippine J. Sc. **5**:485, 1910.
34. Baermann and Wetter: München. med Wchnschr. **57**:2131, 1910.
35. Nichols: J. Exper. Med. **14**:198, 1911; South. M. J. **5**:528 (Sept.) 1912.

There is a paucity of data in the literature concerning the persistency of the Wassermann reaction after the disappearance of yaws lesions following treatment. Many writers record the rapid disappearance of lesions following arsphenamin therapy, but make no mention of the behavior of the Wassermann reaction in these cases. For example, Rost [36] has reported that of 500 cases of yaws eighty-one, 8 per cent., were cured by the intramuscular injection of arsphenamin, 15 per cent. with two, and the remainder with three injections. In the light of the Wassermann studies in our case we can only regard such cases as a clinical cure. Indeed, it is a commonly accepted belief that Ehrlich's unfulfilled hope of accomplishing a therapeutic sterilisans magna with one injection of arsphenamin in syphilis is accomplished in the arsphenamin therapy of yaws. There is no doubt that yaws is more easily cured than syphilis, and that one injection of arsphenamin is considerably more potent than in syphilis.

Baermann and Wetter have observed that the Wassermann reaction may disappear in yaws after two or three injections of salicylate of mercury. After treatment there may be a clinical recurrence. This possibility, however, is considerably less than in syphilis. Both Strong [37] and Castellani [38] have reported recurrences after treatment with doses of 0.3 to 0.4 gm. of arsphenamin, although these recurrences were in a small percentage of the total number of cases treated. A therapia sterilisans magna may be accomplished in yaws with more certainly than in syphilis, but not in all cases, even though there is a disappearance of all lesions. In the light of modern knowledge it is erroneous to regard such cases as necessarily cured.

The persistency of the Wassermann reaction in our case suggests that yaws may continue for some time in an asymptomatic stage after complete disappearance of all the cutaneous lesions in a manner similar to that which occurs in syphilis. This receives confirmatory support from the experience of Castellani, who states that oral treatment should be prolonged for a long time after the complete disappearance of the eruption. As clinical experiments on inoculated monkeys prove that the specific spirochetes may and do persist in the lymphatic glands and internal organs long after the cutaneous manifestations have disappeared.

DISCUSSION

Dr. Fordyce stated that a case of yaws was brought to his clinic last winter from the Naval Hospital in Brooklyn. The patient was an American sailor who had been stationed at Brest, where he came in contact with sailors from all over the world. He had lesions similar to those mentioned by Dr.

36. Rost: München. med. Wchnschr. **59**:924, 1912.
37. Philippine J. Sc. **5**:433, 1910.
38. Castellani: Arch. f. Schiffs.-u. Tropen.-Hyg. **15**:11, 1911.

Schamberg. Professor Lindenberg of Sao Paulo, Brazil, who was visiting the clinic at that time, readily diagnosed the case as yaws. This was confirmed by the easy determination of the spirochetes under the dark field microscope. The Wassermann reaction was strongly positive. Dr. Fordyce suggested that as Professor Lindenberg was present at the meeting he be asked to tell the Association something regarding the distribution of yaws in Brazil.

PROFESSOR LINDENBERG said that he could not avail himself of the invitation to any great extent because he did not speak well in English, but the exposition of Professor Schamberg seemed very complete. He believed he had done all which should be done in the case, and he could only emphasize that in Brazil the most interesting thing was the comparison with syphilis. In Brazil they attached great importance to the difference in the location of the spirochete in the tissue in the two diseases. In yaws the spirochete was always found in the connective tissue; in syphilis, on the contrary, the spirochete is not found in the connective space. When the organisms were found in the miliary abscesses which formed, they were considered specific of yaws.

DR. HIGHMAN was particularly interested in the histologic picture thrown on the screen. He had seen the case Dr. Fordyce described and the histologic material from it. Unfortunately, the technician was ill during the time the Levaditi stain was being prepared, and it was not successful, but the general morphology was particularly interesting. The only striking difference between that specimen and this one was in the tremendous number of plasma cells in the infiltration. He understood from Professor Lindenberg and from the literature that there was a larger number of plasma cells in yaws than in syphilis, and there were much less marked vascular changes. It was the first case of yaws he had ever seen, but he gathered that it was a typical morphologic demonstration of the disease.

DR. RAVOGLI said that when visiting in Florence in the clinic of Prof. C. Pelliszori he saw a case of yaws in a man who had worked for many years in St. Paul of Brazil. He had a papular eruption all over the body, but the nose and palate were most seriously affected, the palate being nearly destroyed. Dr. Ravogli had read of several cases reported by Dr. Splendore, who was working with Castellani. It is a horrible disease, but arsphenamin treatment has diminished its destructiveness.

DR. POLLITZER stated that he was indebted to Dr. Schamberg for an account of his case and photographs, which he submitted to him after seeing the patient. The case had impressed Dr. Pollitzer as being one of yaws rather than syphilis. In addition to the many points brought up by the paper, he was struck with the location of the lesions. The fact that the man had for two months some systemic disorder of an indefinite type was important. If this had been syphilitic fever, the eruption would have appeared within two or three months after his infection. But the kind of eruption which the patient showed did not occur in syphilis so soon after infection and, above all, it did not present the distribution seen in this case. On the other hand, this was just the sort of eruption that one found in yaws. The preliminary period of incubation in which the patient had malaise and rise of temperature, followed by a spirochetal eruption of a character which was not like that of syphilis, spoke strongly in favor of yaws.

In the second place, the extremely rapid disappearance of the lesions after arsphenamin treatment was also characteristic of yaws. It was interesting to recall that in Batavia, where there formerly had been several large hospitals

devoted entirely to the treatment of yaws, these hospitals had been closed or devoted to some other purpose within a month after the introduction of arsphenamin treatment. The condition cleared up so rapidly under arsphenamin treatment that the treatment of yaws had become ambulatory.

DR. SCHAMBERG, closing, said he was particularly interested and pleased to learn from Professor Lindenberg that he regarded the finding of the spirochetes in miliary abscesses in the epidermis as indicative of yaws. Curiously, no such statement is made in Castellani's last book, in which there is a most excellent description of the disease from the clinical and pathologic side. No mention of the occurrence of miliary abscesses and the suggestive localization of the spirochetes in such abscesses is made.

A point of general interest is the fact that Ehrlich's hope of a therapia sterilizans magna, which has failed in syphilis, is apparently achieved in yaws. From the descriptions of various writers, the spirochetes of yaws differ as much from each other as from the spirochete of syphilis. Some contend that it is thicker than the *S. pallida* and others that it is thinner. Noguchi described several types of *Spirochaeta pallida*, one of which was thick and the other thin. Dr. Schamberg thought no one would attempt to differentiate the spirochete of yaws from that of syphilis on morphologic grounds alone. It was interesting that the spirochetes of yaws were largely exterminated by one dose of arsphenamin, while in syphilis this is not true.

DR. WILE asked whether the cultures under anaerobic conditions were negative.

DR. SCHAMBERG, replying to Dr. Wile, said that up to the present time the cultures under the strictest anaerobic conditions had been negative, but they were persisting in their efforts to cultivate the organism from the testicular material, and they hoped to achieve a successful result. He was under the impression that Noguchi had successfully cultivated the organism of yaws in culture. He thought it significant that this organism had failed to take stains in smears which *Spirochaeta pallida* took readily. Many writers had referred to the fact that the yaws' spirochetes were difficult to stain.

PROFESSOR LINDENBERG stated that during the time of slavery in Brazil, thirty or forty years ago, this disease was common among the slaves. After the slaves were made free and the hygienic conditions were improved it became a rather rare disease in Brazil. In the course of a year he would perhaps see only two or three cases. In his opinion improvement resulted not from the use of arsphenamin, but from the better hygienic conditions of the people and the fact that there was not so much chance for contagion as in the days of slavery when many of these people were crowded together in one room.

Abstracts from Current Literature

UEBER DEN EINFLUSS VON QUECKSILBER BEI VERSCHIEDENER DOSIERUNG AUF DIE SPIROCHAETENWUCHERUNG IM MENSCHLICHEN KOERPER (CONCERNING THE EFFECT OF MERCURY AND ARSPHENAMIN IN VARIOUS DOSES ON THE PROLIFERATION OF SPIROCHETES IN THE HUMAN BODY).

W. Scholtz and Kelch, Arch. f. Dermat. u. Syph. **123**:855, 1916.

The authors have previously frequently expressed the opinion that mercury has no direct lethal effect on the spirochetes of syphilitic lesions when administered by injection irrespective of the preparation (soluble or insoluble) used. They report in this communication an attempt made to learn whether mercury given intensively, even almost to the danger point of toxicity, would give better results. Mercury was administered according to the following scheme:

Month	Day	Hour	Dose	Mercuric Chlorid	or	Mercuric Salicylate	or	Calomel
1	1	9	I	0.01-0.02		0.05-0.06		0.04
		3	II	0.01-0.02		0.05		0.04
	2	9	III	0.01		0.05		0.04
		3	IV	0.01		0.05		0.04
	3	9	V	0.01		0.05		0.04
		3	VI	0.01		0.05		0.04

With this type of treatment there was no quicker destruction of spirochetes than with the ordinary procedure. The clinical lesion regressed slightly more rapidly, and the proliferation of the spirochetes was reduced parallel with it. These observations tended to uphold the idea that mercury has only an indirect effect on spirochete proliferation through the cells and serums of the body.

At the close of this series, the authors studied the effect of various doses of arsphenamin on the proliferation of spirochetes. It was their object to learn the smallest amount of arsphenamin that, given at one dose, would give the greatest effect on the proliferation of the spirochetes in papules and patches, and then to learn if the same dose divided into three or four partial doses would have a more or a less active effect on these manifestations.

Further experimentation justified the conclusion that 0.2 gm. of arsphenamin gave the effect desired. Negative findings for the spirochete were reported only after the examination of twenty fields of the dark field had been studied. (In all the experiments, neo-arsphenamin in equivalent dosage was used.)

Eleven patients with active lesions were studied. Arsphenamin was given in the following manner, and dark field examinations positive in every instance prior to the first injection were all negative within twenty-four to forty-eight hours. Typical protocol:

Results of Arsphenamin in Condylomas About Anus and Patches of Throat

Date	Condylomas — Spirochetes	Mucous Patches — Spirochetes
1/ 9	Positive	Positive
1/10	Positive	Positive
1/10 a. m., arsphenamin, 0.05 gm.....		
1/11 p. m., arsphenamin, 0.05 gm....Evening	Negative	Positive
a. m., arsphenamin, 0.05 gm.....		
1/12 p. m., arsphenamin, 0.05 gm....Evening	Negative	Negative
1/13 ..... Evening	Negative	Negative

Thereafter injections were given as follows:

9 a. m.	0.2 -0.25	gm. arsphenamin
1 p. m.	0.25-0.3	gm. arsphenamin
Next day 9 a. m.	0.3	gm. arsphenamin

The doses after the first dose were given only if no ill effects followed. The urine was examined for albumin before each injection, and the quantity was also determined for each interval. Bowel movements were insisted on. The diet was restricted, and alcohol and tobacco were interdicted. After each injection the patient was brought into a light sweat by a hot pack for from one to two hours.

The success of this method has seemed so remarkable that the authors have decided to maintain about the same routine. Many of their patients had been under observation for five and six years. The primary cases have never shown a recidive lesion, although in many treatment was instituted when the Wassermann reaction was positive. From about 85 to 90 per cent. of patients with secondary cases have been cured. The patients included in this estimate had received but one course. If the patients receiving a second course were added, the percentage of cures would be over 95.

The following short bibliography may prove of interest to those seeking further information:

Altman: Dermat. Ztschr. **23**:257, 1916 (contains bibliography).

Scholtz: Deutsch. med. Wchnschr. **39**:1441, 1913; ibid., Ztschr. f. Dermatol. **22**:249, 1915.

Pollitzer: J. Cutan. Dis. **34**:635, 1916.

Hazen: Am. J. Syphilis **2**:778, 1918.

Goodman: Am. J. Syphilis **3**:449, 1919; ibid. **3**:661, 1919; ibid., New York M. J. **112**:494, 1920.

Ormsby: J. A. M. A. **75**:1, 1920.

GOODMAN, New York.

RODENT ULCERS AND ALLIED GROWTHS: AN ANALYSIS OF SIXTY AUSTRALIAN CASES. J. BURTON CLELAND AND NORMAN PAUL, M. J. Australia **1**:407, 1920.

The authors state their belief that in spite of the uniformity of the origin of cells and their presumed equality of potentialities their ultimate highest development depends on the structures among which they find themselves and their situation in relation to the whole body. They believe that the transplantation of the chorionic villi to a denuded surface, for example, after the manner of a skin graft, might lead to successful "take" with the formation of squamous epithelial surface. In their opinion, therefore, the cells of the active parts of the various structures (appendages) of the skin (cells of the pilosebaceous glands and basement layer of the epidermis) have in many cases not entirely lost all their potentialities in forming other structures. Thus the basement layer may still be able to form pilosebaceous glands and cells of the pilosebaceous glands may in their turn be able to form squamous cells. They believe also that on account of the position of the cells such potentialities are suppressed, but that under certain circumstances expression may be given them. The more remote the cell is ontogenetically from these types of structures and the more specialized are its services, the less likely is the expression to be clear and distinct. Thus they find in squamous cell epitheliomas (though in exceptional cases) plasmodial-looking masses which might possibly be interpreted as representing the syncytial covering of the villi. The cells forming the surface epithelium

have less specialized work, and the authors believe that is the reason of the great diversity in behavior of new growths derived from this. They believe they can trace, not only squamous epitheliomas, to the surface epithelium, but also to certain growths resembling rodent ulcers, which they believe are derived from pilosebaceous apparatus.

They, therefore, group epitheliomas into two divisions which, however, grade one into the other—at one end the typical rodent ulcers and at the other typical squamous epitheliomas with well marked cell nests.

1. Typical basal cell epitheliomas usually derived, they believe, from pilosebaceous apparatus comprising clinically and histologically typical rodent ulcers.

2. Atypical basal cell epitheliomas derived from the basal cell layer. They closely resemble the preceding, the cells usually being larger, mitoses more frequent and the concentric arrangement more evident, while the cell masses are irregular and ill-defined, usually without any definite marginal palisade layer.

3. Atypical squamous epitheliomas, comprising undoubted squamous epitheliomas, but in an almost incomplete absence of cell nests clearly indicating a relationship with the rodent type.

4. Typical squamous epitheliomas.

5. Several anomalous growths are also included in this group.

The authors then cite several cases to support their histologic findings.

GUTIERREZ, Manila.

UEBER SILBERSALVARSAN (EIN BEITRAG ZUR FRAGE DER GLEICHZEITIGEN KOMBINIERTEN QUECKSILBER-SILBERSALVARSANTHERAPIE) (SILVER ARSPHENAMIN [A CONTRIBUTION TO THE PROBLEM OF SIMULTANEOUS COMBINED MERCURY-SILVER ARSPHENAMIN THERAPY]). L. ARZT, Dermat. Ztschr. **31**:165, 1920.

The first part of this paper deals with the problem of the value of mercury in the arsphenamin treatment of syphilis. Mercury was reintroduced into the treatment plan when the failure of Ehrlich's "Therapia magna sterilisans" was certain. Whether mercury is essential with the modern plan of injection of the Ehrlich compounds has aroused discussion among therapeutists, who have divided themselves into two classes: one that believes the combination is harmful and one that believes the combination is necessary for success in the therapeutic attack on the disease. Wechselmann, Gennerich, Dreyfuss, Notthafft and others oppose the simultaneous injection, and Kerl, Goldberger and others sponsor the combination treatment.

Since the introduction of "silver arsphenamin" by Kolle, a new factor has entered the discussion. Is it possible that the combination of silver and arsphenamin equals the mercury-arsphenamin combination, and would the three metals, mercury, silver and arsenic, if injected simultaneously, be too much for the organism to eliminate without causing damage?

Silver arsphenamin alone had already been injected by Kerl in a series of cases, but recurrent lesions made their appearance, which led Arzt to formulate this schema:

Silver arsphenamin is injected at twenty-four hour intervals in dosage of 0.15, 0.2 and 0.25 gm. thrice repeated, one week apart. Simultaneously, mercury inunctions are given; eventually injections of soluble cyanid (fifteen treat-

ments) or insoluble salicylate 10 per cent. (eight or ten treatments). The selection of the twenty-four hour interval is accredited to Notthaff, who is said to have used the method for many years.

Arzt treated 53 patients, of whom 16 had primary syphilis; 12 of these were male and 5 female; 37 had secondary syphilis; of these, 12 were male and 25 were female.

He is able to say that the disappearance of *Spirochaeta pallida* from the lesions and the clearing of infectious manifestations is rapid and compares favorably with the old arsphenamin treatment, perhaps being even slightly more rapid in its action. Although Arzt has seen no recurrent lesion, he has not observed the cases long enough to state definitely that these do not appear, and he says that conclusions in this regard are not and cannot be drawn. The blood reaction has been negative after the course of treatment as outlined, except in one case in which the patient had alopecia and gave a positive Wassermann reaction. Of all the patients giving a negative reaction at the end of the treatment, not one had developed a positive reaction since the cessation of treatment. This is thought to be significant. Of course, permanent results will not be known for years.

By effects and ill effects were rare. Angioneurotic syndromes, rise in temperature, icterus and exanthem were encountered only occasionally and were exceedingly mild. Why one patient should develop icterus and all the others should escape remains to be discovered.

Silver arsphenamin is thought to be an exceedingly efficient addition to the armamentarium of the syphilologist.

GOODMAN, New York.

A CONSIDERATION OF CERTAIN ASPECTS FOR PROTEIN HYPERSENSITIVENESS IN CHILDREN. K. D. BLACKFAN, Am. J. Med. Sc. **160**:341 (Sept.) 1920.

A few case reports are given illustrating the most common forms of sensitization, such as eczema, asthma and urticaria due to substances ingested—milk, eggs, cereal, meats and other foods. Alarming symptoms may occur when the infant is first given some of the provocative substance as this hypersensitiveness may be present at birth, although it may be acquired later or conveyed from the mother.

The author uses the von Pirquet method of skin scarification, expecting the reaction within fifteen minutes, which subsides in the course of the next half hour. The intracutaneous method is more delicate, but the results are more difficult to interpret, especially if the reaction is delayed.

Children are not as a rule sensitive to as many different proteins as adults are, the most common substances used by the writer being egg, milk, cereals and meats, horse serum and dander, timothy, red-top and ragweed.

The author's experience agrees with that of others in that he finds that many patients are sensitized to more than one protein and react accordingly, some even reacting to widely varying substances.

In treatment it is not absolutely necessary to omit all protein as many patients are able to ingest small quantities without harm. Desensitization is the most satisfactory method of procedure, the aim being to enable the patient to eat proteins without reaction and also to secure a negative skin reaction. If the patient reacts to only one protein, that protein should be excluded from the diet, after which desensitization may be begun if desired.

JAMIESON, Detroit.

A FATAL CASE OF LUPUS ERYTHEMATOSUS, WITH AUTOPSY. R. Cranston Low, W. R. Logan and Andrew Rutherford, Brit. J. Dermat. & Syph. **32**:253 (Aug.-Sept.) 1920.

This interesting case was that of a young woman who, during the four and one-half years in which she was under observation, had four recurrences of lupus erythematosus, all but one accompanied by an elevation of temperature and with complete disappearance of symptoms between attacks, death occurring after the last attack, which lasted about two months. The second attack, unaccompanied by fever, was of the ordinary type of chronic lupus erythematosus, whereas in the other three attacks the eruption was more widespread and diffuse. The temperature did not at any time resemble the swinging type associated with tuberculosis.

Necropsy disclosed a number of pathologic changes, many of them due to a terminal laryngeal diphtheria. The authors say that it is difficult to draw conclusions from the result of the postmortem examination. The patient undoubtedly suffered from fairly extensive tuberculous lesions; they were not, however, any more extensive than those frequently seen in patients dying of other conditions.

A streptococcus was found in the heart blood at death, but the authors realize that it may have been introduced into the blood shortly before death as a result of the diphtheria. It is possible, however, that this organism may have been responsible for the presence of a subacute pericarditis, evidently nontuberculous. They ask whether it is not possible that the pericardial lesion was a focus from which a streptococcal focus might arise, because these cases of generalized lupus erythematosus, apart from the skin eruption, have many features in common with cases of malignant endocarditis.

Senear, Chicago.

EIN FALL VON SOGENANNTER HYSTERISCHER DERMATOSE (A CASE OF SO-CALLED HYSTERICAL DERMATOSIS). C. Rasch, Arch. f. Dermat u. Syph. O. **121**:21 (Feb.) 1915.

The patient was a 17-year old girl from a rural community, with a history of a chronic skin condition of two years' duration. She had been treated by a number of physicians who had made various diagnoses.

She presented about 130 pigmented and excoriated lesions, each from 6 to 7 cm. in length and from 1 to 2 cm. in width. The lesions were on the anterior surface of the body and extremities. Her back and the posterior aspect of her limbs were practically free. The lesions were parallel to each other. Some were light red in color, others dark red and brown. On a few of them there were bloody crusts.

She had marked anesthesia of her entire skin. She finally admitted that she produced the lesions herself by rubbing with a calloused thumb.

Heithaus, Cleveland.

THE SAPROPHYTISM OF VENEREAL ORGANISMS AND ITS DANGERS. H. Gougerot, Internat. J. Public Health **1**:173 (Sept.) 1920.

Gougerot believes that bacteriologic, clinical and experimental evidence shows that saprophytism of venereal organisms exists. From the point of view of prophylaxis, visceral saprophytism of *Spirochaeta pallida* is important as regards the testicles and salivary glands, for it can be demonstrated that the sperm

may be virulent, even though the testicles appear to be free from disease. He has found "spirochaetae in the mouth or the vaginal mucus of patients who have been treated and apparently cured, so that they have no lesion at the time."

Clinical experiences are cited to show the apparent saprophytism of Ducrey's bacillus, but microscopic proof is lacking.

It is more difficult to prove the existence of the saprophytism of the gonococcus. In the majority of cases which apparently fall into this category there is a latent and deeply concealed gonococcal focus.

At this time he wishes merely to insist on saprophytism as a fact, and to call attention to its great importance in connection with the prophylaxis of venereal disease.

MICHAEL, Houston, Texas.

PAPULO-URTICARIAL RASHES CAUSED BY THE HAIRLETS OF CATERPILLARS OF THE MOTH (EUPROCTIS EDWARDSI NEWN). J. BURTON CLELAND, M. J. Australia **1**:169, 1920.

Rashes following the handling of dead wood were first reported to Cleland in March, 1916. At that time no definite cause could be ascertained. However, in November, three of Cleland's children found about half a dozen caterpillars turning into pupas in flimsy cocoons, under the bark, near the base of an apple tree. The dry cast skin of the hairy caterpillars were mixed with the slight weblike cocoons. The children gathered the cocoons and within two minutes the older ones complained of irritation. In a little while urticarial papules could be seen. Next day their necks were covered with hundreds of small papules still irritating. In one of the children, in addition to papules, some edema of the adjacent eyelid appeared. The papules disappeared in the course of a few days. When the webbing of the cocoons was examined, numerous spicules were found entangled in their threads. The cocoons were sharp-pointed, acuminate, with a central cavity as if filled with air in mounted specimens. The webbing containing the hairlets was acid to litmus paper, and Cleland is of the opinion that the acid was formic acid.

GUTIERREZ, Manila.

UEBER EINEN FALL VON POSTEXANTHEMATISCHER HAEMATOGENER TUBERCULOSIS CUTIS VERRUCOSA MIT PIGMENTHYPERTROPIEN (CASE OF HEMATOGENOUS TUBERCULOSIS VERRUCOSIS CUTIS WITH INCREASED PIGMENT FOLLOWING EXANTHEM). MARTIN SILBERSTEIN, Arch. f. Dermat. u. Syph. **123**: 863, 1916.

A man, 41 years old, who did not have tuberculosis, had measles at the age of 14. Following this exanthem he suffered with pulmonary disease, chronic inflammation of the left elbow joint and chronic inflammation of the skin of different localities in the following order: left elbow, neck, right elbow, buttocks. Warty formation, in the course of the process, regressed leaving thin white scars and occasional areas of increased pigmentation. The lung condition became more serious and the patient died. The skin changes, from their clinical and histologic aspects, were those of tuberculosis verrucosis cutis. The suprarenals did not disclose any lesions on histologic examination, and the case cannot be identified with Addison's disease. The pigmentation is thought to be the result of the extremely chronic course of the disease (over twenty-five years).

GOODMAN, New York.

DERMATOLOGIC ABSTRACTS

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

ARGYRIA FOLLOWING INJECTIONS OF SILVER ARSPHENAMIN. LOCHTE, Therap. Halbmonatsh. **34**:334 (June 15) 1920.

Lochte reports a case in which a young woman of 21, who had contracted syphilis for the first time, received seven injections of neo-arsphenamin, whereupon all manifestations disappeared within eight weeks. A relapse occurred ten months later, at which time the diagnosis was: syphilis nodosa of the scalp; gummatous periostitis of the tibia; syphilitic ulcer on the right arm. Some of the ulcers were fresh, some were scarred over, with distinct marginal infiltration. She was referred to a specialist. A month later she reappeared and stated that she had consulted a specialist, who gave her twelve injections of silver arsphenamin. The first injection was given intramuscularly, simultaneously into the right and left buttocks (0.2 gm.). There was no special pain. Five days later icterus appeared, which lasted fourteen days. Treatment was, however, not discontinued, as the patient felt well. A few days later, the patient noticed for the first time an ashen gray discoloration of the skin, which rapidly became more marked. When last seen the skin of the face and body presented a steel-gray color, which gave a peculiar impression. Even the eyes showed the same color. There were no outward manifestations of syphilis. Lochte did not see the case himself. Sweating treatment and homeopathic remedies, self-prescribed, were of no avail.

NEUROSYPHILIS INVESTIGATION OF MASSACHUSETTS COMMISSION ON MENTAL DISEASES. O. J. RAEDER, Am. J. Insan. **76**:449 (April) 1920.

A complete recovery mental, physical, and laboratory, after less than five years or ten years or even before death Raeder says may be questioned. An apparently recovered neurosyphilitic may show none of the above signs or findings, yet at necropsy following intercurrent disease of senility, a focus of inactive treponemas may be found to occupy a circumscribed area somewhere in the brain, just as is commonly found an area of fibrosis or calcification in the lungs, the scar of a healed tuberculosis. In 428 cases of neurosyphilis treated during a period of four years, 129 cases or practically 30 per cent. showed definite benefit. One hundred and twenty-five patients are under treatment in hospitals of which a certain percentage can be expected to show similar improvement. The relatives (spouses, parents, offspring) of syphilitics and neurosyphilitics form a most important group in which not only syphilis but the earliest degrees of neurosyphilis, in the presymptomatic, often entirely unsuspected stages, are brought to light by lumbar puncture and sero-analysis. It is in these types that by far the most benefit can be expected.

NEUROSYPHILIS AND PSYCHOSES. L. G. LOWREY, Arch. Neurol. & Psychiat. **3**:500 (May) 1920.

Nineteen cases are presented by Lowrey of which fourteen were undoubted cases of neurosyphilis, one case of pseudoparesis and four had negative physical and equivocal serologic findings. Of the fourteen undoubted cases only four presented clinical evidence from which a diagnosis of neurosyphilis could be made. Since neurosyphilis may exist in association with any type of mental symptoms, and since such states may exist in the absence of any of the usual signs and symptoms of neurosyphilis, Lowrey urges that lumbar puncture should be done at least in all cases which present any atypical features. It is equally important to puncture in cases with any clinical signs of neurosyphilis, since the signs may be misleading.

PATHOGENESIS OF EPITHELIOMAS. IV. K. YAMAGIWA and K. ICHIKAWA, Mitteilungen a. d. med. Fak. d. kais. Univ., **22**:1 (Aug. 28) 1919.

The Journal has mentioned from time to time the success of Yamagiwa and Ichikawa in inducing the production of epitheliomas by painting the rabbit ear with tar. They here report similar research on the mammary gland. In 6 per cent. of 47 cases, repeated application of a tar-lanolin mixture was followed by changes in the tissues, as they show in ten handsome plates, which are of an unmistakable adenochancroid or carcinoma type. Their research is being continued with the aid of the Japanese Cancer Research Society and a special grant from the government. They say that they have never learned of an instance of spontaneous mammary cancer in rabbits. They injected subcutaneously 1 c.c. of the mixture of lanolin and an aqueous extract of tar, twice a month and later once a month, or the injection was made with 0.3 c.c. of pure tar directly into the mammary gland once a month. The rabbit with the adenochancroid cast four litters during the 463 days of the experiments.

TARDY HEMIPLEGIA IN SYPHILITICS. H. VEDSMAND, Ugesk. f. Læger **82**:1077 (Aug.) 1920.

Vedsmand relates that there was a history of syphilis in 15 per cent. of 81 patients with hemiplegia that had developed after 60. He knows of only one publication on the connection between hemiplegia and syphilis since the Wassermann test was introduced. This one article is H. A. Thomas' monograph on 740 cases of hemiplegia; he found syphilis in 11 per cent. of those in the forties; 7 per cent. in the fifties (Vedsmand, 12.5 per cent.); 13 per cent. in the sixties (Vedsmand, 25.7 per cent.), and none beyond this, while Vedsmand had 8.8 per cent. in the seventies.

JAUNDICE FOLLOWING NEO-ARSPHENAMIN TREATMENT. H. H. SILBERGLEIT and FÖCKLER, Ztschr. f. klin. Med. **88**:333, 1919.

Silbergleit and Föckler relate that in the winter of 1917-1918 they had thirteen cases of acute yellow atrophy of the liver, all fatal, and all occurring in syphilitics who shortly before had been given mixed mercurial and neoarsphenamin treatment. In eight other cases severe jaundice developed, but the men recovered. Weil's disease could be excluded, but nothing could be found to explain these cases. A fourteenth case of atrophy developed outside but it was not known whether the man had been taking treatment or not.

FATE OF CHILDREN OF SYPHILITICS. MARIE KAUFMANN-WOLF and EMMY ABRAHAMSON, Ztschr. f. klin. Med. **89**: 274, 1920.

This article reports the fifth series of the kind, including 213 living children of syphilitic parents. The total mortality for the entire five series was at least 70 per cent. when the mother was infected, and under all conditions it was about 50 per cent. The morbidity of the living averaged 50 per cent., so that only 25 per cent. of the children in the 134 families grew up healthy.

GENERAL PARESIS AMONG ARABS. A. POROT and N. SENGÈS, Ann. d. méd. **6**:444 (Jan.) 1920.

The total absence of general paresis among Arab syphilitics has long attracted attention. Not even the stress of years of service at the front brought any tendency to general paresis among the Arab troops. Porot and Sengès relate that in their experience at Alger, notwithstanding the extreme prevalence of syphilis, they have never encountered but one instance of general paresis, and this was of such a mild form that the Arab officer was able to serve for more than three years at the front, and the necropsy findings were meager.

Society Transactions

NEW YORK ACADEMY OF MEDICINE, SECTION ON DERMATOLOGY AND SYPHILIS

DR. JOHN E. LANE, *Chairman*

Regular Meeting, Oct. 5, 1920

VERRUCAE OF FEET. Presented by DR. TRIMBLE.

The patient, aged 36, was a man from Porto Rico. There was no history of any similar condition or tuberculosis in the family. He gave no history of a previous illness bearing on the condition presented, and denied any venereal history. He stated that his occupation was that of a fireman, and that he had previously worked in Porto Rico as a laborer in the sugar and tobacco fields.

The condition began on the left foot twenty-five years ago as a small verrucous lesion about the size of a small pea. The lesions gradually became larger and more numerous, some of them running together. After five months other lesions appeared on the right foot. The lesions on the hands followed scratching of the lesions on the feet—as the patient remarked, after getting blood on the fingers from the feet. He had received no treatment. The lesions were on the hands and legs, on the dorsa of the feet and on the penis, as well as a few on the trunk. They were dark brown and verrucous in type. The greater part were discrete, but they had become confluent over the dorsa of the feet.

DISCUSSION

DR. HERMAN GOODMAN said he had seen the patient at the meeting of the Clinical Society of the New York Skin and Cancer Hospital, and he agreed with Dr. Trimble that it was ordinary verruca. Among 12,000 drafted men in Porto Rico, he had seen at least thirty cases as extensive as this one. The coffee plantations on which the patient had worked are all moist, and the men and women work barefooted. They are constantly in contact with the moist ground and get these hypertrophic warts on the lower extremities.

LUPUS ERYTHEMATOSUS CIRCINATUS OR SARCOID? Presented by DR. SCHEER.

William O'D., 27 years of age, a native of the United States, an engineer, presented himself at Dr. Fordyce's clinic on October 4 with a lesion on the left cheek of two months' duration. It began as a "pimple," which enlarged after picking so that when presented it was the size of a twenty-five cent piece. The center of the lesion was flat, the follicular openings slightly gaping. The skin was of a violaceous red color, with a raised infiltrated border topped with thick scales which when raised revealed small depressions. The scales showed many small projections, which fitted into these depressions. Histologically the section resembled sarcoid.

FOLLICULITIS DECALVANS. Presented by DR. HOWARD FOX.

W. L., a man, 30 years of age, born in Russia, a carpenter by trade, had lived in the United States for the past ten years. The disease appeared suddenly and without apparent cause about four months ago, attaining its maxi-

mum development within a week. He had never before had any disease of the scalp as far as he was aware. No members of his family were similarly affected. The eruption did not cause any subjective symptoms.

On examination, the greater part of the vertex was found to be covered by closely crowded, circular, discrete, completely bald patches averaging from one-quarter to one-third inch in diameter. These presented slight redness and numerous fine nutmeg-like pin point follicular keratoses. On palpation of the scalp, great inequalities of the surface were detected, consisting of ridges and depressions. There were no crusts or stiff hairs of favus, and a microscopic examination of the hairs showed no fungus. There was also an absence of the redness and scaling of lupus erythematosus, and there were no cutaneous lesions except those on the scalp. The patient was being treated with the quartz lamp.

PARAPSORIASIS LICHENOIDES. Presented by DR. WISE.

N. A., a boy of 12, born in Poland, and under the care of the Vanderbilt clinic, had had the disease for six months. The patient presented a generalized maculopapular eruption, the lesions varying in size from that of a large pinhead to that of a pea. Some were pale, others pink, and others red. There was no itching. Many of the lesions were slightly indurated, especially those on the neck. Treatment had been of no avail, the lesions persisting despite the use of chrysarobin ointments.

ONYCHOMYCOSIS (FIVE CASES). Presented by DR. HOWARD FOX.

These cases, from Ellis Island, were shown through the courtesy of Dr. J. W. Kerr of the U. S. Public Health Service. All of the patients were immigrants from Europe, who had arrived in the United States during the past month. They showed various dystrophic changes in the nails of fingers and toes, clinically characteristic of onychomycosis, and confirmed by microscopic examination. In each case the diagnosis was trichophytosis of the nails, though this was not culturally differentiated from favus. The individual records were:

S. G., a man 27 years of age, born in Poland, gave a history of having had the nail condition for four years. No member of his family had been similarly affected. The disease was confined to the middle finger of the right hand and ring and little finger of the left hand. The toe nails were not involved.

A. T., a woman 55 years of age, a native of Poland, stated that the nails had been diseased for thirty years. None of her family were similarly affected. She had never been treated. Four fingers of the left hand showed the presence of onychomycosis.

B. L., a woman 64 years of age, born in Poland, gave a history of having had diseased nails for about thirty years. No member of her family had had a similar disease. All the nails of the right foot, four of the left foot and all the nails of the left hand were affected.

A. G., a man 38 years of age, born in Portugal, stated that the disease had first appeared fourteen years ago. None of his family or friends had been similarly affected. The nails of the fingers and toes were diseased.

N. R., a man 30 years old, born in Italy, gave a history of nail disease since childhood. He had two brothers who had a similar condition. He had served for six years in the Italian army. All the fingers of the right hand, except the index finger, were involved.

DISCUSSION

DR. J. W. KERR, chief medical officer at Ellis Island, said that at Ellis Island a careful watch was kept for favus of the scalp and nails and many cases had been found, especially in recent months. Dr. Fox, on visiting the island in his official capacity occasionally, had been greatly interested in this class of cases and had asked that these patients be shown tonight. The diseases among aliens which were of interest to the dermatologist were grouped under what was called Class A (11), generally known as loathsome contagious diseases, including syphilis and other venereal infections, yaws and other mycotic infections. The medical inspectors were constantly on the lookout for them on account of their chronicity and importance to the public health. Favus is an exceedingly difficult disease to treat by any method, and the patients under treatment usually remain under their care from three to six months. After treatment by the roentgen ray, it is necessary to hold the patient for several weeks after the hair grows out in order to determine whether the causative organism is present, since that is the only criterion by which cure can be determined.

It was gratifying to have the members of the Section observe these cases of favus and ringworm of the nails, loathsome contagious diseases which were rather readily curable. It had been found that on removal of the nail and treatment of the nail bed the infection can be eradicated. This was different from the experience with disease of the scalp. It was the general experience that patients with favus of the nails were not likely to have favus of the scalp. This had proved to be an interesting observation to him, but one well known to dermatologists with experience.

EPITHELIOMA OF THE PENIS. Presented by DR. L. SPIEGEL.

L. J., an Austrian and a machinist by occupation, an unmarried man under treatment at the Lenox Hill Hospital and Dispensary, presented a sore on the penis of about five weeks' duration. He gave a history of a chancre fourteen years ago for which he received no treatment. He denied any sexual exposure during the last eight years. The lesion was irregular and crater-like in character, situated on the dorsum of the penis at the junction of the inner surface of the prepuce and corona glandis. It was about 2.5 cm. in diameter, the edges being hard and pearly, the base red and granular in appearance. There was a profuse serous discharge. There was no glandular enlargement. The Wassermann reaction was ++++; there were two antigens.

Microscopic examination of the biopsy specimen showed a neoplasm consisting of strands and alveoli of stratified squamous epithelioma in which pearl formation was extensive and mitotic figures rather common. This epithelial new growth was invading the connective tissue surrounding the neoplasm in all directions. Three intravenous injections of the arseno-benzol brand of arsphenamin—a dose of 0.5 gm. each on September 26, 28 and 30—caused no improvement of the ulceration.

ACQUIRED FACIAL PIGMENTATION, WITH PROBABLE POLYGLANDULAR TROUBLE. Presented by DR. WISE for DR. THORNLEY.

E. W., a young man 18½ years of age, under treatment at the Vanderbilt clinic, had had the condition two months; it was said to have followed sunburn. He presented an irregular mottled chloasma-like pigmentation of

the face, backs of the hands and in the axillary folds. He also presented gray hairs in the scalp and pubes, effeminate hair distribution and wide spacing of the perineum.

DISCUSSION

Dr. Wise said that the case was interesting from the standpoint of endocrine disturbance. The patient had been seen by Dr. Casamajor, who suggested suprarenal and dyspituitary trouble, but nothing definite. It was interesting that a young man of 18 should have a suddenly acquired pigmentation of the face which was not chloasma. The feminine distribution of the pubic hair and the graying of the scalp hair made the case interesting from the point of view of the ductless glands.

Dr. Levin said that the pigmentation was dependent on the endocrines. Besides the points mentioned, the patient had long extremities, long fingers with broad distal phalanges, large ears, prominent malar eminences, overgrowth of the eyebrows with a meeting of the hairs over the nose, a low downgrowth of the scalp hair on the temporal regions and forehead and a separation of the incisors.

A radiograph of the skull might show a large pituitary gland or a crowded gland enclosed in the sella turcica with the clinoid processes approaching one another. In these conditions, the suprarenals are more or less exhausted and with the disturbance in the chromaffin system the regulation in the pigment deposits is affected and patches of abnormal pigmentation appear. This is all part of a compensatory endocrine syndrome.

In a patient seen recently at the hospital, of about the same age as the boy presented, similar signs were observed, and the blood pressure proved to be low. Addison's disease was suggested, and this diagnosis was later corroborated by internists. This patient should be studied for hypo-adrenalism and for a possible beginning Addison's disease.

Dr. Highman said he hesitated to discuss disturbance of the endocrine glands, though he was willing to concede the general principle that every one is the sum total of the interplay of the various endocrines—physically, morally, and mentally—but the entire subject is still in the speculative stage, and we do not know what we mean when we apply endocrinology to dermatology. Dr. Highman had no desire to cast a slur on the subject, however. It is evident from what we know of the suprarenal gland that it has a strong effect on pigmentation, but what the pituitary gland may do in these conditions we can only conjecture, and until we have more specific knowledge, we should proceed slowly. What we have heard tonight simply amounts to saying that the man has brown spots because he has them.

LICHEN PLANUS ANNULARIS. Presented by Dr. Parounagian.

F. McD., aged 25, Irish, single, a laborer, had been in this country for the past six years. There were a few scattered lesions on the forearms. About six weeks ago the patient noticed lesions on the glans penis. These did not itch. On the buccal surface of the right cheek was an annular white lesion of lichen planus. The lesions first appeared on both legs about two years ago, and have persisted. New lesions occasionally appear on the feet and legs. These itch moderately. A Wassermann test was made on October 4, but the report had not been received. There was no history of syphilis.

CASE FOR DIAGNOSIS. Presented by DR. PAROUNAGIAN.

Louis T., aged 25, a Cuban negro, married, a cigarmaker, two years ago had had gonorrhea, and treatment was administered by injections. He complained of itching and burning near the anterior end of the penis. A physician had cauterized a urethral abscess, which resulted in a fistula back of the meatus. Another doctor was then consulted; he gave three injections into the arm vein. Following this, the patient developed severe edema of the penis and inability to urinate. No Wassermann test was made. A third physician who opened the urethra to allow urination, split open the anterior portion of the urethra. The patient stated that the wound healed but never closed properly. About three weeks ago itching developed, first on the back. One week later, an eruption appeared all over the body. The patient then took some "blood pills" for about a week. At Lenox Hill Hospital he was given a brownish ointment which relieved the itching but did not influence the eruption. He had had no local applications for the past four days.

The patient could not speak English well. A tentative diagnosis of pityriasis rosea was made, and further suggestions were requested. Dr. Parounagian said he would endeavor to watch the case and report on it at the next meeting, but there were a great many more lesions on the face than when Dr. Fox saw it first, and the entire extremities were involved.

DISCUSSION

DR. HOWARD FOX thought the case unquestionably one of pityriasis rosea. The diagnosis seemed clear from the duration (three weeks) and the presence of generalized superficial, dry, scaly, discrete patches with a circinate tendency. The presence of lesions on the neck or face did not rule out pityriasis rosea.

ARSPHENAMIN DERMATITIS. Presented by DR. PAROUNAGIAN.

J. H., an Englishman, 40 years of age and single, who presented himself for treatment at Bellevue clinic, sixteen years ago had had a chancre, for which he received treatment by mouth for two and a half years. About three months ago a Wassermann reaction of + was obtained by the board of health laboratory. He therefore received ten injections of arsphenamin and sixteen mercurial injections at the Post-Graduate Hospital. Following the eighth injection of arsphenamin, he began to suffer from intense itching, erythema and a "goose-flesh" appearance of the skin. There was no weeping or moisture of the skin. About three weeks after the appearance of the generalized rash, his skin began to peel. For the past week he has had numerous pustules. The Wassermann reaction at Bellevue was + on Sept. 22, 1920.

RETARDED ROSEOLA. Presented by DR. PAROUNAGIAN.

C. M. J., from Dr. Parounagian's clinic at Bellevue, aged 35 and single, was born in the United States, a ship's storekeeper, had had an exposure nine months ago, and a chancre developed on the foreskin three weeks later. Circumcision was performed one week after the appearance of the sore. He had received one injection of arsphenamin and mercury pills for a few days. He had had no further trouble until two months ago, when a rash appeared on the cheeks and forehead. It disappeared in about two weeks.

A month ago he developed a rash on the trunk, arms and thighs. For the past three days this has been marked, especially on the arms. There was

no itching. The right tonsil showed small mucous patches; the left tonsil showed folliculitis. There was some general congestion of the throat. The inguinal glands were enlarged, discrete, shotty, but not painful. The epitrochlears were negative; the anterior and posterior cervical glands were moderately enlarged. The Wassermann reaction, Sept. 28, 1920, was +++.

LICHEN NITIDUS. Presented by DR. PAROUNAGIAN.

Z. M., a Greek, 19 years of age and single, a bus boy, first noticed the lesions about a year ago. He stated that for the past year he had lost weight, although he felt well and strong. He had never had a severe illness, and he denied venereal disease.

The lesion consisted of minute shining papules, mostly follicular in character, more pronounced on the flexor surfaces and most noticeable on the chest, back and genitals. There had never been any itching. The dorsum of the tongue showed whitish plaques of a membrane-like appearance. The lesions on the glans penis were annular, with a good deal of scaling and some pigmentation. The scrotum was studded with shining, irregular papules, closely resembling lichen planus. The Wassermann reaction was negative on Sept. 28, 1920.

DISCUSSION

DR. WISE said that the lesions on the shaft of the penis and back of the neck were characteristic of the disease as described in the textbooks, and were similar to those demonstrated by Dr. Trimble last year; but he was puzzled by the large papular lesions on the glans penis. If one saw only the glans penis he would think it was lichen planus, but the combination of the two was unusual. There was no relationship between the two, and any diagnosis should be corroborated by microscopic examination of the lesions on the back of the neck and on the glans.

DR. LANE said that the lesion on the penis covered the whole glans and was not limited to the site of the circumcision scar. He did not remember whether lichen nitidus had been described as affecting the glans. When he first saw this lesion he had considered it lupus erythematosus, but on closer examination he had considered it lichen planus. He agreed with the diagnosis of lichen nitidus on the shaft of the penis.

DR. WISE said that the lesions on the glans penis were almost the size of a lentil, altogether different from the pinhead lesions on the shaft. The lesions appeared to him like two entirely different conditions.

DR. PAROUNAGIAN said that when he first saw the case he had remarked that the lesions on the penis looked like lichen planus, but after considering all the symptoms together, he had decided it was not that.

PHAGEDENA OF PENIS: MIXED INFECTION. Presented by DR. PAROUNAGIAN.

M. W., a seaman, aged 22 and single, born in the British West Indies, had had a chancre at the sulcus eight and a half months ago. Later he developed a balanitis and a circumcision was performed three months after the appearance of the chancre, but the wound never healed. The phagedenic ulceration destroyed a large part of the skin of the penis, and ulceration of the corpus spongiosum produced a loss of a large part of the anterior urethra.

At Kings County Hospital on July 27, the Wassermann reaction was ++++. He was given six arsphenamin and five mercury injections. At the end of this treatment the Wassermann reaction was +, but the genital ulceration remained unimproved.

He appeared at the Bellevue clinic on September 22. The Wassermann reactions on September 22 and 28 were both negative. A Ducrey examination made on September 24 was positive. He had received arsphenamin on September 23, 27, 30 and on October 4. On September 30 and October 4 the ulcerated area was irrigated with arsphenamin solution, 0.1 gm.; this was followed by slight improvement. Suggestions as to treatment were requested.

DISCUSSION

DR. TRIMBLE asked whether the man had syphilis also.

DR. PAROUNAGIAN replied in the affirmative; but the man had had the chancre eight and a half months ago.

LICHEN PLANUS NODULARIS. Presented by DR. SCHEER.

Mrs. S. E., from the Vanderbilt clinic, aged 52 years, had lesions located on both legs, and there was one patch on the left elbow. There were numerous nodular discoid elevated, reddened and indurated lesions scattered over the legs and knees, associated with itching. The patient had had eleven roentgen-ray treatments, ¼ units (skin distance) once a week, resulting in great improvement. Previous treatment had not been beneficial. The mucous membranes were free. The Wassermann reaction was negative.

POSTARSPHENAMIN PIGMENTATION: ARSENICAL KERATOSIS. Presented by DR. HERMAN GOODMAN.

A man, aged 32, had had a chancre on March 1, 1920, followed by an adenopathy of the groins and a general eruption in April. The Wassermann reaction was ++++. Arsphenamin treatment was instituted during the secondary stage of the disease. The patient received twenty-two injections, receiving injections twice a week. Treatment was then interrupted because the eruption appeared; it was renewed until a total of thirty injections had been given. No mercury injections had been given. The patient received drops and rubbings. It had not been practicable to get into communication with the doctor who treated the patient to learn the dosage and preparation used. The patient was seen for the first time the previous night at the West Side Dispensary (service of Dr. Leo Michel). He had previously made one visit to the Post-Graduate Dispensary in New York.

DISCUSSION

DR. HIGHMAN said that he had had an opportunity to examine the patient by daylight at the Post-Graduate Hospital, and he very much doubted the history of syphilis. He was told that the patient's Wassermann reaction was positive, and that he had received arsphenamin, but the pigmentation seen last week suggested the pigmentation left by lichen planus. At that time also the patient said the eruption itched. Whether or not he had had syphilis, the remaining pigmentation was quite characteristic and was much more likely to be that of a faded lichen planus than the result of arsenic.

DR. LAPOWSKY inquired concerning the kind of lesions on the lower extremities.

DR. HIGHMAN replied that they were just such simple small brown pigmentations or spots as were seen after lichen planus—precisely as shown tonight.

DR. WISE inquired whether it would be possible to get an arsenic reaction from a piece of tissue. Had any one obtained arsenic from the tissue in such a case?

DR. HIGHMAN replied that Unna had described an arsenic reaction, but that he himself had not been able to make it work.

DR. GOODMAN said that the absence of lesions on the mucous membranes influenced him against accepting a diagnosis of pigmentation following lichen planus. He believed that the pigmentation was on the site of the secondary syphilitic eruption. The keratoses present about the waist, where there was irritation from the wearing of a belt, led him to believe it to be the result of arsenic. Should the patient permit, a section would be taken for further study.[1]

FOLLICULITIS CHRONICA ATROPHICANS. Presented by DR. ABRAMOWITZ.

Lena W., aged 22, a Russian Jewess, was referred to Dr. Fordyce's clinic by Dr. Thornley of Gouverneur Dispensary. The eruption was of about five years' duration and was located on the chest, back, back of the thighs and extensor aspect of the extremities. It consisted of many fine comedo-like plugs, with depressed scars about the size of a pinhead and smaller. These were scattered diffusely over the above areas, with an occasional follicular pustule here and there.

DISCUSSION

DR. WISE said he had seen the patient for the first time during the evening. Dr. Trimble had suggested the diagnosis of acne keratosis, a name given by Crocker to a condition characterized by blackheads and subsequent atrophy. He himself had never before seen a case of this kind.

DR. TRIMBLE expressed the opinion that the case would come under the classification he had mentioned. Crocker had reported two or three cases and called them acne keratosa. In Crocker's cases the lesions were located on the face and shoulders. He, himself, had seen another case in which the arms and face were involved. The malady was something like acnitis, the only difference being that there were little horny spines which eventually fell out, leaving punctate atrophy as in this case. The lesions in this instance were more numerous than in the case he had seen, but he was convinced that it was acne keratosa, described by Crocker.

DR. ROSEN said that he had examined the case carefully at the clinic. He had never before seen a case of the same type. The active lesions looked like the lesions of a lichen scrofulosorum. A few of the lesions on the upper extremities were possibly acnitis. The microscopic picture would probably reveal some form of tuberculid of the skin.

TUBERCULOUS GUMMAS. Presented by DR. LEVIN.

M. R., a married woman, aged 45, was born in this country and had always been well. Her family and past history were negative. The condition began about fifteen months ago with a swelling of the left leg. The swelling was

1. The patient was seen the next night. He brought a report of a negative Wassermann reaction from the Post-Graduate Hospital. He was leaving for another city within twenty-four hours.

painful, softened slowly, and formed an ulcer at the end of two months. New swellings gradually appeared over the lower extremities and back, which also tended to ulceration and healed slowly. When the patient first came under observation, two months ago, there were about a dozen large pea-sized to cherry-sized hard and soft growths scattered over both lower extremities. The skin over the lesions was normal and purplish in color. An unhealthy quarter-dollar sized ulcer with undermined purplish edges was present on the front of the left leg. Under observation, the new hard nodules grew slowly to involve the skin, softened and ulcerated. Scattered over both lower extremities were numerous hard and soft subcutaneous nodules which showed a tendency to become confluent and form soft matted-together masses. The skin over these nodes was purplish red in color. On the left leg and on the outer aspect of the right thigh were half-dollar sized, irregular unhealthy ulcers with granulating floors and undermined edges. The discharge from these ulcers was purulent.

Pathology: Tuberculosis. The Wassermann reaction was negative.

LEUKODERMA PSORIATICUM. Presented by DR. ABRAMOWITZ.

Mary B., 10 years of age, born in the United States, was brought to the Vanderbilt clinic with extensive macular leukodermatous patches on the forehead, trunk and extremities, and with typical psoriatic patches present on different parts of the body. There was no definite history of using chrysarobin nor any signs of chrysarobin dermatitis. The patient had been using white and black salves, but denied that they stained her clothes.

EPIDERMOLYSIS BULLOSA ACQUISITA. Presented by DR. WISE.

Mrs. G. C., aged 21, exhibited a condition with which she had been suffering for eight months. She presented evidences of healed vesicles and bullae on the bends of the elbows, the hands, face and feet. The middle finger of the right hand, ulnar side, presented an active vesicle due to pressure from the adjoining ring. The skin of the elbow region showed moderate atrophy. There were epidermal cysts on the fingers and on the shells of the ears. The lesions arose both spontaneously and as a result of traumatism.

The term acquisita was included in the title of the case because the patient was the first member of the family to show the conditions.

DISCUSSION

DR. LAPOWSKY said that "acquisita" meant acquired, not hereditary. If the term acquired were introduced in epidermolysis bullosa, it could only mean that the patient was the first in the family who acquired the epidermolysis bullosa. In expressing such a condition it would be better to use a more descriptive form, as "first in the family," and not the word "acquisita."

DR. ABRAMOWITZ said that the patient was positive that she had never had the condition before nor had any member of the family or relatives had the disease, and that this disease occurred after a normal confinement. She had had lesions on the nose and in the mouth, and some on the body, which seemed to have cleared up under arsenic which she had been receiving. She had never noticed that her skin was vulnerable in any way, particularly to injuries that produced blebs or bullae. She said that sensitiveness was acquired since she had had the first attack of bullous eruption after her confinement. There was no consanguineous marriage.

DR. WISE said that Dr. Lapowski's point was well taken, but that name had been used long before by others. It was applied to cases in which the family history for generations back was obtained and was negative. Why the patient should have lived for twenty-one years without any previous manifestation of the condition was a question.

LUPUS ERYTHEMATOSUS DISSEMINATUS. Presented by DR. BECHET.

B. H., a female adult from the service of Dr. Trimble at the University and Bellevue clinic, stated that the eruption had been present for thirteen months. It began on the nose and soon thereafter appeared on the cheeks. In July, 1920, the fingers and backs of the hands became involved. A few weeks later the eruption appeared on the chest, neck and arms. These lesions consisted of various sized plaques with symmetrical spots on the extensor surfaces of the third phalanges of the fingers. They were sharply marginated, of a rather dusky red color and slightly scaly. There was congestion and slight atrophy at certain points apparently undergoing involution. Burning and itching, so frequently complained of in this type of lupus erythematosus, was also present. The patient appeared to be in good health. A physical examination proved negative. The patient's mother, four brothers and one sister had always been well. Her father had died of gastric carcinoma several years before.

DR. BECHET said that the lesions were quite large, one of them on the back of one hand being almost 2 inches in diameter. He had observed them for two months, and in that time there had been no change in their appearance. There were no papules or vesico-bullae. The plaques were dry, slightly scaly, and in a good light were atrophic in the center. The face was greatly involved. In view of these facts a diagnosis of disseminate lupus erythematosus seemed more obvious than erythema multiforme.

CARCINOMA OF TONGUE. Presented by DR. PAROUNAGIAN.

T. D., a man of 51, born in the United States, a bartender, gave a history of chancre a year ago, which received only local treatment. He entered the Bellevue clinic on Aug. 2, 1920, with a history of ulceration of the tongue of four months' duration, which was gradually increasing in size. Examination showed an irregular ulcer on the left side of the dorsum of the tongue, about 2 inches from the tip. Another isolated area was present on the left lateral aspect of the tongue, anterior to the first one. The anterior cervical glands on the left side were enlarged. The Wassermann reaction on August 2 was + + +. The treatment consisted of arsphenamin, 0.15 gm., administered on August 5, 12, 16, 19 and on September 9, 16 and 23.

On August 31 the patient was referred to the General Memorial Hospital for radium treatment. It was not thought wise to use radium. On September 7, Dr. Douglas in consultation advised against operation.

The patient was having increasing pains in the tongue and for the last few weeks had complained of pain in the throat and difficulty in swallowing.

DERMATITIS HERPETIFORMIS (PAPULAR FORM). Presented by DR. WISE.

Louis S., a Russian Jewish pedler, 52 years of age, applied at the Vanderbilt clinic for treatment of a skin trouble of seven years' duration. The trouble disappeared during the winter and spring but recurred during the summer.

The eruption consisted of pruriginous papules — some of them excoriated — located on the extensor surfaces of the extremities and on the back of the shoulders.

PRECANCEROUS DERMATOSIS? XERODERMA PIGMENTOSUM?
Presented by Dr. L. Chargin.

A woman, aged 35, an Italian, married and the mother of four children, since early childhood had been affected with freckle-like spots which were located especially on the upper chest, arms and face. The lesions increased

Precancerous dermatosis.

in size and in number, in the course of years, making their appearance on the back, abdomen and legs and becoming especially thick on the neck and face.

At the time of presentation, the face, neck, upper chest and arms were greatly affected; while the back, abdomen and legs showed numerous but scattered lesions. The lesions consisted of freckle-like spots—most of them with a slightly raised and verrucous border—small atrophic areas with similar borders, crusted and fungoid tumor masses and cutaneous horns. The flat lesions were for the most part yellowish or brownish in the center with darker pigmented borders; many of them, however, were distinctly red. Most of the

verrucous lesions were darkly pigmented. The tumor formations were red and irregular over the surface as well as in outline. Scraping the flat lesions, a pellicle was easily removed, revealing a moist red, slightly oozing surface. The lesions varied in size from that of a pinhead to that of a twenty-five cent piece; they were for the most part in close apposition, and in many areas were confluent. The tumor formation varied in size from that of a pinhead to 2½ inches in their longer diameter.

The tendency to epitheliomatous degeneration began about three years ago, and at the time of presentation there were about a dozen lesions. Under the right eyelid and on the back of the right hand were cutaneous horns.

The patient complained of no subjective symptoms, and her general health was good. The urine and blood Wassermann tests were negative. None of her offspring was similarly affected, but a brother of the patient was said to be suffering from a mild type of the affection.

Dr. Chargin said that though the patient presented many of the characteristics of xeroderma pigmentosum, there was absence of others, such as the telangiectasia, the general thinning or parchment-like skin. After making a biopsy, Dr. Highman reported precancerous dermatosis.

MORPHEA. Presented by DR. ROSEN.

Elizabeth F., aged 37, presented a patch of morphea on the left flank in the waist line, roughly triangular in outline and about 6 inches long, the base being about 3 inches. The patch was pink in color and was slightly indurated. There were three smaller patches on the right side of the abdomen.

CHICAGO DERMATOLOGICAL SOCIETY

Regular Meeting, Oct. 20, 1920

C. A. BAER, M.D., *Presiding*

ARSENICAL HYPERKERATOSES. Presented by DR. H. N. COLE.

A man, aged 22 years, with a history of epilepsy of nine or ten years' duration, four years ago had first noticed papular lesions on the palms and soles that were becoming keratosed. At that time he was told that arsenic had not been used, and that he had been given only sodium bromid.

Two or three of the lesions had been treated experimentally with radium, which caused temporary disappearance. The patient then consulted another physician who administered roentgen therapy; he subsequently returned to Dr. Cole with a more acute case of keratosis. He had received no arsenic since first seen but had formerly received arsenic with sodium bromid over a long period of time. Hyperpigmentation was present under the arms.

ARSENICAL HYPERKERATOSIS AND PIGMENTATION. Presented by DR. WAUGH.

A boy, aged 9 years, had received Fowler's solution for chorea two years previously, beginning with a dose of 5 minims after meals which was gradually increased to 10 minims. Three or four months later the patient's mother noticed a roughness of the palms which later spread to the dorsal surface of both hands and fingers. The plantar surfaces were similarly involved.

Examination revealed small, hard, scaling, hyperkeratotic lesions, so numerous as to be indistinguishable over most of the palmar surface, but on the dorsal surface the individual lesions were quite distinct. There was generalized dusky brownish pigmentation of the skin, which was most marked over the chest, back and abdomen.

DISCUSSION

DR. COLE thought the interesting fact was that most of the process had formed after arsenic administration had been discontinued.

DR. ORMSBY thought it was interesting to see patients of this sort because it was hard to explain why the condition often progressed after the drug was discontinued. When arsenical keratoses were started they frequently continued for years after discontinuance of the drug. The pigmentation and other symptoms would largely disappear, but the keratoses would remain. Arsenic seemed to originate some process in the patient which persisted in spite of removal of the exciting factor.

DR. FOERSTER stated that he had recently seen two cases in which epithelioma developed on arsenical keratoses. In one of the cases arsenic in small doses had been taken for a long time to prevent a bromid eruption, the bromid being given to control epileptic attacks. The growth developed on one finger. The other patient developed an epithelioma on the foot after having taken arsenic for a long time for psoriasis.

DR. PUSEY said that twenty years ago he had made a photograph of arsenical hands, when this condition was not as commonly recognized as it is now. Fifteen or sixteen years later the man returned with epithelioma and subsequently died of carcinoma. He agreed with what had been stated about the persistence of arsenical keratosis after the drug was discontinued, but he had had an interesting experience in that connection. A man with this disorder well developed on the palms and a history of having taken arsenic had been told by him that the trouble was permanent. The patient then consulted one of his colleagues and the growths disappeared; hence, it was not certain that early arsenical keratosis always persisted or became worse.

DR. BARR thought the methods by which patients secured arsenic were rather interesting. In a case of arsenical neuritis seen by him the patient was in the habit of chewing match sticks. This was the only arsenic he received, but laboratory tests showed it to be present in the match sticks.

CASE FOR DIAGNOSIS. Presented by DR. WAUGH.

The patient was the child who was shown at the May, 1920, meeting of the Society, with the history of having at birth an unusual amount of coating over the body, which dried and resembled a collodion covering; it began to exfoliate in large sheets at the end of forty-four hours.

Subsequent History: The child had nursed normally, gained in weight and slept normally, but the skin had exfoliated four or five times. Following the exfoliation the surface appeared perfectly normal in some places, but there was an ichthyotic appearance in others. Soothing ointments and bland lotions had been used.

DISCUSSION

DR. ORMSBY said that he had made a suggestion before in this case and thought it still held. The cases were formerly described as ichthyosis; Bowen first called attention to the fact that they were different from ichthyotic cases.

Immediately after birth the skin looked as if it were covered with collodion, and it was smooth and shiny. Subsequently some infants developed ichthyosis but many of them died; the patient he had shown several years ago lived only three weeks. Bowen thought the condition was due primarily to a retention of the epitrichial layer, which was not thrown off at the time it ordinarily should have been during gestation. The point of interest was that the cases were so closely allied to ichthyosis but were not identical.

DR. FOERSTER asked whether the child had been given thyroid preparation.

DR. WAUGH stated that the child had received only local treatment. The interesting point to him was the length of time the baby had lived. In 1895 Bowen reported five cases of this disorder, and in 1909 others were recorded by the same author, but few of the patients had lived more than a few weeks. This child was now a little more than 5 months old, and, as far as the skin element was concerned, it would probably live indefinitely.

A CASE FOR DIAGNOSIS. Presented by DR. FINNERUD for DR. ORMSBY.

A colored man, aged 29 years, presented areas of hyperpigmentation of one year's duration, situated chiefly on the forehead, temples and cheeks, but also present on the upper chest in front and behind. The macules were of irregular outline and fairly sharply demarcated; they were from grayish-blue to purplish, and in all instances darker than the surrounding grossly normal skin. The lesions varied in diameter from the size of a pinhead to that of a silver quarter or more, the only large areas being on the forehead near the scalp hair line; most of those of the chest and cheeks were chiefly the size of a match-head or smaller. There had never been any swelling or subjective sensation. The patient had always been in good health and denied all venereal, drug and previous skin history, except a possible Neisserian infection, for which he received no silver salts.

DISCUSSION

DR. FINNERUD could suggest no diagnosis. There was no history of the use of drugs, and he did not know whether there was any preceding inflammatory condition; according to the patient, there was not. The patient sought relief because he considered the spots disfiguring.

DR. GUY said that the man admitted a urethritis in 1918, and said that he took pills for two weeks at that time. He thought that, on account of the peculiar bluish color of the spots with mucous membrane involvement and the absence of any preceding inflammatory process, it might be an argyria.

DR. ORMSBY said that he saw the patient for the first time in the clinic the day before and obtained no record of his use of argyrol or other silver preparations. The patient said it was embarrassing to have the black spots.

LICHEN PLANUS SCLEROSIS ET ATROPHICUS. Presented by DRS. ORMSBY and MITCHELL.

A woman, aged 59 years, had had the disorder for one year. The lesions were typical, flat, white papules, situated chiefly on the front of the neck and over the clavicles. The papules presented hyperkeratotic horny spines typical of the disorder. In addition, there was some atrophy where the papules had undergone involution. There were no subjective symptoms.

The patient was receiving roentgen therapy, a method which had proved successful in similar cases.

DISCUSSION

DR. ORMSBY considered this a typical case of lichen planus sclerosis et atrophicus, and he had presented it merely as an example of that disease. The patient had first been seen two months before.

DR. COLE said he had a case of lichen planus atrophicus with typical lesions on the clavicles under observation. On the back there were two lesions about half the size of the palm, with the whole area hypertrophic. Over these areas there were some atrophic spots with a plug in the center, while around the abdomen was a characteristic band of the same sort.

DR. SENEAR was reminded by Dr. Cole's case of the one he had presented last year with Dr. Pusey. The patient was a woman with numerous discrete and grouped lesions with a single large patch. In diagnosis it was difficult to make a differentiation between white spot disease and lichen planus atrophicus, but he had felt that it was the latter condition. In the case now shown, Dr. Ormsby had called his attention to certain differences, and he was now inclined to think their case was one of white spot disease. He had recently seen another case similar to the one shown last year, but with more eruption and without the plaque present in their other case and in the one now mentioned by Dr. Cole. He believed that Dr. Ormsby's case was a lichen sclerosis, but in the other two cases there was more doubt as to white spot disease.

LUPUS ERYTHEMATOSUS. Presented by DR. LIEBERTHAL.

The patient was a woman, aged 24 years, whose trouble started a little over a year ago with spots on the left cheek, which gradually developed also over the forehead, right cheek and nose.

The spots were red, slightly raised on the periphery, more or less rounded, with desquamation. No subjective symptoms had been noted at any time. Most of the lesions had healed, but traces remained of some of them, and there was a typical lesion in the right zygomatic region, slightly thinned out. Her general condition was good.

DISCUSSION

DR. LIEBERTHAL said he had learned to be exceedingly careful about using powerful treatment in these cases. In the superficial form of the disease, as in this case, he believed the mildest treatment was necessary. During the last six months he had treated several patients with a simple application that had been recommended twenty-six or twenty-seven years ago by H. von Hebra, and which consisted of rectified alcohol, ether and peppermint water, equal parts. This was painted over the affected areas every two or three hours and had given good results in every case, whereas severe treatment did not give good results in the superficial form.

DR. PUSEY asked whether any one had obtained good results from painting the chronic patches of lupus erythematosus with phenol. He had recently seen a case in which an excellent man had used liquid phenol with great improvement.

DR. MCEWEN asked whether any one had found lupus erythematosus associated with streptococcus infection, as reported in recent issues of the *British Journal of Dermatology*. He thought focal infection should be considered a possible cause in this case.

DR. PUSEY said he had recently seen an acute lupus on the face with a sinus infection. His attention was first called to the bland treatment by Crocker.

DR. OLIVER said he had seen seven cases of lupus erythematosus at Rush Dispensary last year and they had all seemed to improve a good deal on quinin, 2 grains, three times a day, with a simple zinc oxid and calamin lotion.

DR. FISCHKIN said that lupus erythematosus is so uncertain as to the results of treatment and is comparatively so frequent that one is compelled to try all kinds of treatment. After the mildest remedies have been used without any results, one is inclined to resort to stronger methods of treatment. He had used all methods, among them, Hollander's quinin and iodin, carbon dioxid, ultraviolet and roentgen rays; in some cases he had secured good results with the latter when all other methods had failed.

DR. LIEBERTHAL emphasized the fact that he used the bland treatment in only the superficial cases. In severe cases he used carbon dioxid but did not apply it for longer than five seconds for each treatment. In chronic cases with deep lesions, he agreed with Dr. Fischkin that the ultraviolet ray sometimes worked like a charm, but this was not true in all cases.

DR. ZEISLER recalled two cases that had been cured with tuberculin that had failed to respond to other treatment. The doses of tuberculin were small, and improvement might have been merely a coincidence.

HYDROA. Presented by DR. WAUGH.

A colored girl, aged 10, had had the disorder seven years. There were numerous vesicles, most of them the size of a split pea, on the dorsal surface of the hands and extensor surface of the forearms; over these areas there were also many scars from former lesions. A similar condition was present on the legs below the knees. The skin on the neck and lobes of the ears was rough, scaling and thickened; scarring in these areas was not pronounced. The eruption was associated with marked pruritus. It disappears entirely during the winter, recurring in the spring.

DISCUSSION

DR. PUSEY had thought of hydroa, but there were some lesions in the palms, where the exposure to light was slight, and he thought the case would not fit in with a hydroa estivale. He thought it was a lichen urticatus (a papular eczema) on the extremities, with some vesicle formation.

DR. WAUGH considered the case interesting on account of the rarity of the disorder and the fact that the arms and legs were so extensively involved. To him the recurrent and small eruption was also of interest. He had seen a woman several months ago who had had a recurrent eruption about the neck for five years, where the skin was uncovered, and on each arm above the elbow where the skin was covered with the sleeves. If she remained out of the sun it would disappear but if she were outdoors, even though the skin was covered, it would reappear. No vesicles were present at any time, but there was itching similar to that present in the case shown. There was no eruption on any other part of the body. He wished to know whether anything could be done to prevent a recurrence in this group of cases.

DR. SENEAR had nothing to suggest as to therapy, as he was unable to make a definite diagnosis. The case impressed him as belonging in the lichen urticatus group rather than in the hydroa estivale group. No dermographia was present, but there was a distinct urticarial element. He had seen only two cases of true hydroa and in both of those the scarring was deep and characteristic, while in this case it was not definite.

A CASE FOR DIAGNOSIS. Presented by DRS. ORMSBY and MITCHELL.

A man, aged 26 years, presented a disorder which had been present for twelve years. The lesions were brown patches situated on the lower extremities, and the eruption was about equally distributed over both thighs and both legs. The size of the patches varied from that of a fingernail to that of a palm; some were larger. The chief characteristic was pigmentation, but in addition there was telangiectasia and in some areas distinct atrophy. As a whole, the patch presented a reddish-brown center and a lighter brown periphery. The patient said that there were no subjective symptoms, that the patches were slowly increasing in size and that no patch had disappeared.

DISCUSSION

DR. WILE thought no one could venture a definite diagnosis of the case because at the present stage it apparently did not fall into the category of any known disease. To him it suggested definitely that the patient was bleeding into his skin, and for that reason one would look for some change in the chemistry or physical condition of his blood. He apparently had an unusual form of purpura which persisted and spread peripherally. Dr. Wile thought it would be interesting to know something of the coagulation time of the blood, either in the patient himself or in his antecedents, as he might belong to a family of hemophiliacs. An investigation along this line might lead to a proper understanding of the pathologic physiology of the process.

DR. PUSEY said the case did not appeal to him as a disturbance in the blood but rather as a local disturbance in the blood vessels. Dr. Foerster had called his attention to the fact that there were telangiectasies in the lesions, and Dr. Pusey's impression was that it was a vascular disturbance. The situation was this: The man had permanent hemorrhagic spots, long present, which remained in the same place. It seemed to him the appearance which was suggested was rather one of some disturbance in the blood vessels in these areas which provided for extravasation, and that was the probable explanation. He thought it was not a purpura annularis telangiectodes, but an analogous process.

DR. ORMSBY stated that he had seen a similar case several years ago, the only difference being that the disease in the other patient had progressed further. When the former patient was shown, many thought the cutaneous condition was due to radiodermatitis. The patient had pigmentation, telangiectasia and atrophy in areas, but to a more pronounced degree than in this case. Even after considerable investigation a diagnosis was not made. When that patient was first seen he had an indurated lesion on the glans penis which was followed by metastatic growths in the groin, with subsequent generalized metastatic growths. At necropsy the diagnosis of lymphosarcoma was made, the opinion being that it originated in the glans. The superficial cutaneous lesions had been present for years and apparently bore no relation to the

sarcomatous condition which developed at a later date. The histology of the cutaneous lesions revealed nothing. In his opinion, the present case presented similar cutaneous lesions. No biopsy had been made in this case as yet, but one would be made and reported on later. He thought these two cases were in a class by themselves.

LYMPHANGIOMA. Presented by DR. ORMSBY.

A girl, aged 14, had a group of lesions on the eyelid and a tumor mass in the mouth occupying one half of the roof on one side, extending backward to and involving the pillar of the pharynx. They had been present since birth, but had caused trouble only during the past seven years. The lesions in the mouth occurred as a lobulated mass covered with vesicles. Some involvement of the blood vessels was probably present as parts of the mass presented a deep bluish shade. The eyelid lesions were typical of a simple lymphangioma.

DISCUSSION

DR. PUSEY thought it was an interesting case of lymphangioma, with an unusual distribution.

DR. ZEISLER asked what treatment was to be used.

DR. ORMSBY said that they would use radium as it was more convenient to use in the mouth.

TRICHOPHYTOSIS. Presented by DR. WAUGH.

A woman, aged 40, whose disorder had been present for four years, did not remember which nails were first involved. At the time of presentation most of the nails on the hands and one on the right foot presented a broken, ragged, dirty brownish appearance, with a distinct teased appearance in places. The trichophyton fungus was found microscopically.

DISCUSSION

DR. LIEBERTHAL agreed with the diagnosis of trichophytosis, and stated that the nail plate was lifted up and split horizontally, which was indicative of this disorder.

A CASE FOR DIAGNOSIS. Presented by DR. ZEISLER.

A woman, aged 47, had an eruption which had been present for four years on the body and arms. The condition was apparently stationary at the time of presentation.

The lesions were indurated plaques on the neck and back and scattered over the body. She had been seen first by Dr. Zeisler on the day before presentation. A biopsy had been made by Dr. Stillians previously who, he hoped, would report his findings. The Wassermann reaction was negative.

DISCUSSION

DR. WILE suggested the diagnosis of "erythrodermie" possibly premycotic, and thought one could say nothing more than that. It was well known that the scaly erythrodermas, so-called, or parapsoriases, which were excessively

pruritic, might develop mycosis fungoides. The crescentic lesions on the forearm could probably be considered as more than presumptive evidence that it belonged to the premycotic form.

DR. STILLIANS said that he saw the patient last year and showed her with the idea of a premycotic eruption in mind. A biopsy had revealed nothing, and the investigation was negative.

DR. PUSEY asked whether Dr. Wile used the term erythroderma in the sense of parapsoriasis. He questioned the propriety of speaking of erythroderma in that technical sense as a possible premycotic lesion. He thought many of the patches were very much like chronic eczema; many might be taken for parapsoriasis but others could not.

DR. WILE thought there was just as much reason for saying it was a parapsoriasis as a premycotic condition. The presence of extreme pruritus, he thought, was presumptive evidence that it was a premycotic dermatosis. He asked whether it was not a fact that the Society had seen several cases presented as parapsoriasis, which subsequently developed mycosis fungoides. He thought he recalled two or three such instances.

DR. PUSEY asked whether the Society had not also seen several cases presented as the premycotic stage of mycosis fungoides, which had not developed into mycosis fungoides. The premycotic stage of mucosis fungoides had become a sort of refuge in times of perplexity; nearly every time we see a dry dermatitis we cannot make out, we are likely to talk about the premycotic stage of mycosis fungoides. He believed this woman did not have the premycotic stage. It seemed to him that many of the lesions might be those of chronic eczema in a fat, dirty person. The puzzling things were the velvety lesions in front of the axillae; they did not fit in either with parapsoriasis or the premycotic stage of mycosis fungoides.

DR. COLE thought several of the lesions showed a condition of lichen Vidal, but he was inclined to believe that it might be the premycotic stage of mycosis fungoides.

DR. ZEISLER stated that he had recently seen a case that was almost identical with this one. The man had visited the Mayo clinic, and had had his teeth and tonsils taken care of, with no improvement in the cutaneous condition. He administered Fowler's solution and roentgen therapy, and the condition cleared up entirely. The eruption had been present for four years and was intensely pruritic, and this was the first treatment that had ever helped him. Dr. Zeisler did not know what the diagnosis was, but he believed the case was parallel to the one presented.

DR. FINNERUD said the patient had been at the Rush Medical College Dispensary, where the treatment given was that for lichen simplex chronica. She had given the impression that she had lesions only on the extremities.

ICHTHYOSIS. Presented by DR. STILLIANS.

A woman, aged 40, had had ichthyosis since early childhood. There were five children in the family, all girls; the first, third and fifth had ichthyosis while the second and fourth did not have the condition. The fourth child died in infancy. The skin of the trunk and limbs was dry and slightly scaly, with the exception of the skin of the palms and soles, which was thickened and demarcated in large figures. The lower part of the face was also involved.

DISCUSSION

DR. STILLIANS wished to know whether he would be justified in giving thyroid in the case. The patient had been using glycerin on the hands.

DR. PUSEY thought it would be well to keep the patient's skin greased, and believed it would do no harm to administer thyroid extract and watch the effect. Greasing the skin was the only measure he knew that caused improvement. He was interested in the improvement in the condition of the hands.

DR. ORMSBY stated that he had found 25 per cent. glycerin and 75 per cent. olive oil effective in such conditions. This was suggested to him by Dr. Morris several years ago, and he had used it ever since with excellent results.

VON RECKLINGHAUSEN'S DISEASE. Presented by DR. ZEISLER.

The patient was a woman, aged 35 years, whose disease began in early childhood. No other members of the family were affected. The tumors were generalized over the body. The patient was presented for therapeutic suggestions.

DISCUSSION

DR. PUSEY asked whether the woman was duller than normal. He had been looking for stupid patients with von Recklinghausen's disease for a long time but had seen few that were below normal mentally.

DR. ZEISLER stated that the patient's mentality seemed to be normal.

LUPUS VULGARIS. Presented by DRS. ORMSBY and MITCHELL.

A boy, aged 14, had had the disorder for seven years. His condition was unusual in that he presented a markedly elevated nodular mass about 2 cm. in diameter, situated on the left cheek just in front of the zygoma. He had previously suffered with tuberculosis of the knee joint.

LESIONS OF THE LIPS. Presented by DR. FISCHKIN.

A Mexican woman presented a lesion of the lips which had begun eight weeks previously. There were sores in the mouth but no lesions on the body. The lips were greatly swollen, red and crusted. There was a history of a similar attack fourteen years before.

DR. GUY stated that in his service in the army there was a case similar to this one. During the investigation they found a fusiform bacillus and a spirillum, and on local application of arsphenamin the patient recovered. The case did not agree with a Vincent's angina clinically, and he did not think the present one did.

DR. COLE thought the case was rather unusual and, as the patient was a Mexican, an unusual disease might be suggested, but some of the more common diseases should be considered as well. He had thought of impetigo with streptococcus and believed this might be the condition. The lesions on the mucous membranes were like those described by Dr. Montgomery many years ago.

DR. WILE was inclined to agree with Dr. Cole. The rapid course of the disease indicated some acute infection. It was not impossible that it had been caused by infection from her teeth or from some streptococcic infection,

not necessarily in the mouth. He recalled the case mentioned by Dr. Stokes in which the upper lip looked like the one in this case, but the lower lip was not involved. He also recalled the case of a patient with a similar upper lip, a young boy, that turned out to be glanders. It looked exactly like this, and the patient died within a short time.

Dr. Zeisler stated that he had recently seen two cases of impetigo in brother and sister with involvement of the lip in one. He believed that if syphilis could be ruled out, impetigo should certainly be considered.

Dr. Lieberthal thought that antisyphilitic treatment should be instituted, not intensively but in order to rule out syphilis, if possible.

Dr. Fischkin said he could not elicit much of the history, but the physician who brought the patient said the Wassermann reaction was negative. Dr. Fischkin saw the patient for the first time just before presenting her. He thought it was a pus infection and suggested appropriate treatment, an astringent wash for the mouth and a small amount of mercurial ointment for the lip to be applied for a few hours each day. If this treatment proved successful, the diagnosis could be made.

ANGIOKERATOMA. Presented by Dr. Fischkin.

A girl, aged 7, first seen seven weeks previously, had a congenital nevus vascularis over the lateral aspect of the left thigh, extending from below the knee to the buttock, with numerous large angiectases. There was no history or sign of chilblains. Two years ago minute, dark red, elevated lesions, whose size ranged from that of a pin point to that of a pinhead, appeared in different parts of the nevus. Some of them became the size of a pea or larger, becoming harder in time, with black, rough tops, assuming a warty appearance. They gave no inconvenience, with the exception of bleeding when scratched or bruised. Some of the lesions were red, elevated, flat tumors, dotted with black spots; others were solid, warty excrescences. Many of them Dr. Fischkin had removed by means of electrolysis, their location being marked by black crusts. There was a pinkish scar in the middle of the thigh, which was the result of chemical cauterization employed by a physician two years previously, on the edge of which new wartlike lesions had soon reappeared.

DISCUSSION

Dr. Stillians was impressed with the appearance of the general angioma of bluish color, but could offer no explanation for the central hypertrophic development.

Dr. Pusey said that he had seen an angiokeratoma somewhat like this.

Dr. Cole called attention to the fact that some of the angioma lesions had become necrosed. It looked like an angiokeratoma, but he had never seen one on the thigh.

Dr. Fischkin said that most of the angiokeratomas were described as occurring in erythematous skins due to chilblains, but in this case it had formed on the nevus, which was unusual.

Dr. Ormsby presented a photograph of malignant pustule, taken about six weeks previously, which resulted from the use of an infected shaving brush. The micro-organisms of anthrax were demonstrated without difficulty in serum from the lesion, and the brush was found to be infected. The patient had

purchased a new brush and had only used it twice when he developed the disease. He was treated with anti-anthrax serum and made a good recovery. When first seen he had a temperature of 105 F. and was desperately ill. Treatment was instituted immediately, and he began to improve. No surgery was employed and nothing but an antiseptic retention dressing was applied to prevent the micro-organisms from being carried to others. The brush used by the patient, together with others of the same manufacture, were taken in charge by the State Board of Health.

DR. PUSEY said he thought all the cases found during the war had been shown to be due to brushes made of Oriental hair, and the infection did not occur in the better grade of shaving brushes—the more expensive ones.

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